310 CMR 22.00: DRINKING WATER

Section

22.01: Purpose and Authority

(1) 310 CMR 22.00 is intended to promote the public health and general welfare by ensuring that public water systems in Massachusetts provide to the users thereof water that is safe, fit and pure to drink. 310 CMR 22.00 is promulgated pursuant to the authority conferred by M.G.L. c. 21A, § 2(28), and M.G.L. c. 111, § 160. Pursuant to M.G.L. c. 30A, §§ 1(5), 2 and 3, 310 CMR 22.00 is promulgated to set forth those standards and requirements of general application and future effect which shall be used to implement, interpret and enforce M.G.L. c. 40, §§ 15B, 38, 39B, 39C, 40, 41, and 41A; M.G.L. c. 111, §§ 2C, 5E, 5F, 5G, 17, 143, 159, 160A, 160B, 162 and 165; M.G.L. c. 114, §§ 35 and 36; M.G.L. c. 140, §§ 32B and 32H; and M.G.L. c. 165, §§ 4B and 6.

22.01: continued

(a) The Department affirms its authority to determine compliance or initiate enforcement actions related to 310 CMR 22.00 based upon analytical results and other information compiled by its sanctioned representatives and agencies.
(b) 310 CMR 22.22 is promulgated pursuant to the authority conferred by M.G.L. c. 111, §§160 and 160A.

(2) Effective Dates.
(a) Except as provided in 310 CMR 22.01(2), 310 CMR 22.00 shall take effect on June 24, 1977. Rules and Regulations For the Purpose of Preventing The Pollution And Securing The Sanitary Protection of Certain Waters Used As Sources of Public Water Supply, approved and adopted by the Department of Public Health on October 11, 1960 and filed with the Secretary of the Commonwealth on June 1, 1961, are repealed as of the effective date of 310 CMR 22.00.
(b) Except for 310 CMR 22.06(2)(c), the effective date for 310 CMR 22.06, 22.07, 22.07A is January 1, 1993.
(c) The effective date for 310 CMR 22.07B(1)(a)(1) through (a)(8) is January 9, 1989.
(d) The effective date for 310 CMR 22.07B(1)(a)(9) through (a)(18) and of 310 CMR 22.07A(1)(a)(1) through (c)(18) is July 30. 1992.
(e) The maximum contaminant level for lead shall remain effective until December 7, 1992; the maximum contaminant level for barium shall remain effective until January 1, 1993.
(f) The effective date for 310 CMR 22.06(2)(a) is October 2, 1987 and for 310 CMR 22.06 (2)(b) and 310 CMR 22.06(2)(d) through 310 CMR 22.06(2)(k) is July 30, 1992.
(g) 310 CMR 22.05 became effective January 1, 1991.
(h) The effective date for 310 CMR 22.06(2)(l) through (p), 22.07A(1)(t) through (hh) and 22.07B(1)(s) through (v) is January 17, 1994
(i) The effective date for 310 CMR 22.11B is July 1, 1995.
(j) The effective date for 310 CMR 22.16A is the date of promulgation.
(k) The effective date for 310 CMR 22.07C is the date of promulgation.
(l) The effective date for 310 CMR 22.07E and 310 CMR 22.20D is January 1, 2002.
(m) The effective date for 310 CMR 22.20E is the date of promulgation.
(n) The effective date for 310 CMR 22.20F is January 1, 2005.
(o) The effective date of 310 CMR 22.09A is December 8, 2003.
(p) The arsenic maximum contaminant level (MCL) listed in 310 CMR 22.06(2)(c) is effective for the purpose of compliance on January 23, 2006. Requirements relating to arsenic set forth in 310 CMR 22.06(2), 310 CMR 22.06(4), 310 CMR 22.06(15), 310 CMR 22.06(16), and 310 CMR 22.06(17), are effective for the purpose of compliance on January 23, 2006. The Consumer Confidence Rule reporting requirements relating to arsenic listed in 310 CMR 22.16A(10) are effective for the purpose of compliance on March 23, 2001.

22.02: Definitions

(1) As used in 310 CMR 22.00, the following terms shall have the following meanings:

Abandoned Source means a source that is physically disconnected from a public water system and is no longer maintained as an active, inactive, or emergency source. Abandoned source(s) can not be used as a public water system source. A source may only be abandoned pursuant to 310 CMR 22.25.

Action Level means, for the purpose of 310 CMR 22.06(B), the concentration of lead or copper in water specified in 310 CMR 22.06B(1)(c) which determines, in some cases, the treatment requirements contained in 310 CMR 22.06B that a water system is required to complete. The definition of Action Level for the purpose of a consumer confidence report is contained in 310 CMR 22.16A.

Active Source means an approved source(s), monitored and maintained to meet 310 CMR 22.00 and used for primary or backup purposes to meet consumer demands as necessary.

Administrator means the Administrator of the Agency.

Agency means the United States Environmental Protection Agency.

22.02: continued

Approved Source means a water supply source approved by the Department for drinking water purposes pursuant to 310 CMR 22.03(1).

Bank means the portion of the land surface which normally abuts and confines a water body; it lies between a water body and a bordering vegetated wetland and adjacent flood plain, or in the absence of these, it lies between a water body and an upland; the upper boundary of a bank is the first observable break in the slope or the mean annual flood level, whichever is lower; the lower boundary of a bank is the mean annual low flow level.

NON-TEXT PAGE

22.02: continued

Best Available Technology or "BAT" means the best technology treatment techniques, or other means which the EPA or Department finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available (taking cost into consideration).

Certified Operator means an operator who has received a certified of competency issued by the Board of Certification of Operators of Drinking Water Supply Facilities in accordance with 236 CMR 2.00, 3.00, 4.00, and 5.00 and currently maintains a valid license.

Coagulation means a process using coagulant chemicals and mixing by which colloidal and suspended materials are destabilized and agglomerated into flocs.

Commissioner means the Commissioner of the Department of Environmental Protection

Compliance Cycle means the nine-year (calendar year) cycle during which public water systems must monitor. Each compliance cycle consists of three-year compliance periods. The first calendar year cycle begins January 1, 1993 and ends December 31, 2001; the second begins January 1, 2002 and ends December 31, 2010; the third begins January 1, 2011 and ends December 31, 2019.

Compliance Period means a three-year (calendar year) period within a compliance cycle. Each compliance cycle has three-year compliance periods. Within the first compliance cycle, the first compliance period runs from January 1, 1993 to December 31, 1995; the second from January 1, 1996 to December 31, 1998; the third from January 1, 1999 to December 31, 2001.

Comprehensive Performance Evaluation (CPE) means a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements. The comprehensive performance evaluation must consist of at least the following components: assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a CPE report.

Confluent Growth means a continuous bacterial growth covering the entire filtration area of a membrane filter, or a portion thereof, in which bacterial colonies are not discrete.

Consecutive Public Water System means a public water system that obtains all of its water from another public water system, but is not owned or operated by, a public water system which is subject to 310 CMR 22.00.

Contaminant means any physical, chemical, biological or radiological substance or matter in water.

Conventional Filtration Treatment means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal.

Corrosion Inhibitor means a substance capable of reducing the corrosivity of water toward metal plumbing materials, especially lead and copper, by forming a protective film on the interior surface of those materials.

CT or CTcalc is the product of "residual disinfectant concentration" ("C") in mg/l determined before or at the first customer, and the corresponding "disinfectant contact time" ("T") in minutes, i.e., "C" x "T". If a public water system applies disinfectants at more than one point prior to the first customer, it must determine the CT of each disinfectant sequence before or at the first customer to determine the total percent inactivation or "total inactivation ratio." In determining the total inactivation ratio, the public water system must determine the residual disinfectant concentration of each disinfection sequence and corresponding contact time before any subsequent disinfection application point(s). "$CT_{99.9}$" is the CT value required for 99.9%

22.02: continued

(3-log) inactivation of *Giardia lamblia* cysts. $CT_{99.9}$ for a variety of disinfectants and conditions appear in Tables (1.1-22.20A through 1.6-22.20A, 2.1-22.20A and 3.1-22.20A) in 310 CMR 22.20A(5)(b)3.

$$\frac{CTcalc}{CT_{99.9}}$$

is the inactivation ratio. The sum of the inactivation ratios, or total inactivation ratio shown as

$$\frac{(CTcalc)}{(CT_{99.9})}$$

is calculated by adding together the inactivation ratio for each disinfection sequence. A total inactivation ratio equal to or greater than 1.0 is assumed to provide a 3-log inactivation of *Giardia lamblia* cysts.

Customers, for the purpose of 310 CMR 22.16A, means billing units or service connections to which water is delivered by a community water system.

Department means the Department of Environmental Protection of the Commonwealth of Massachusetts.

Detected Contaminant, for the purpose of 310 CMR 22.16A, means at or above the method detection levels reported by the certified laboratory which shall be less than or equal to the method detection levels prescribed by 310 CMR 22.00.

Diatomaceous Earth Filtration means a process resulting in substantial particulate removal in which (1) a precoat cake of diatomaceous earth filter media is deposited on a support membrane (septum), and (2) while the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the feed water to maintain the permeability of the filter cake.

Direct Filtration means a series of processes including coagulation and filtration but excluding sedimentation resulting in substantial particulate removal.

Direct Responsible Charge means accountability for and performance of active, daily on-site operation of the facility or system, or a major segment of the facility or system where shift operation is not required. Where shift operation is required "Direct Responsible Charge" shall mean accountability for and performance of active, daily on-site operation of an operating shift, or a major segment of the operation of the facility or system.

Disinfectant means any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone, which is added to water in any part of the treatment or distribution process, and which is intended to kill or inactivate pathogenic microorganisms.

Disinfectant Contact Time ("T" in CT calculations) means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration ("C") is measured. Where only one "C" is measured, "T" is the time in minutes that it takes for water to move from the point of disinfectant application to a point before or at where residual disinfectant concentration ("C") is measured. Where more than one "C is measured, "T is (a) for the first measurement of "C", the time in minutes that it takes for water to move from the first or only point of disinfectant application to a point before or at the point where the first "C" is measured and (b) for subsequent measurements of "C", the time in minutes that it takes for water to move from the previous "C" measurement point to the "C" measurement point for which the particular "T" is being calculated. Disinfectant contact time in pipelines must be calculated based on "plug flow" by dividing the internal volume of the pipe by the maximum hourly flow rate through that pipe. Disinfectant contact time within mixing basins and storage reservoirs must be determined by tracer studies or an equivalent demonstration.

Disinfection means a process that inactivates pathogenic organisms in water by chemical oxidants or equivalent agents.

22.02: continued

Disinfection Profile means a summary of daily *Giardia lamblia* inactivation through the treatment plant.

Distribution System means a system of conduits (laterals, distributors, pipes, mains, and their appurtenances, and in some cases includes interior plumbing) by which potable water is distributed to consumers. For the purpose of 310 CMR 22.00, the distribution system may include the source booster pumping stations, storage tanks and reservoirs, and chlorination and/or disinfection facilities.

Division means the Drinking Water Program, one of the programs within the Bureau of Resource Protection comprising the Department of Environmental Protection.

Domestic or Other Non-distribution System Plumbing Problem means a coliform contamination problem in a public water system with more than one service connection that is limited to the specific service connection from which the coliform-positive sample was taken.

Dose Equivalent means the product of the absorbed dose from ionizing radiation and such factors as account for differences in biological effectiveness due to the type of radiation and its distribution in the body as specified by the International Commission on Radiological Units and Measurements (ICRU).

Effective Corrosion Inhibitor Residual, for the purpose of 310 CMR 22.06B only, means a concentration sufficient to form a passivating film on the interior walls of a pipe.

Emergency Source means any source of water used to supplement or temporarily replace a public water system's active or inactive source(s) when water of sufficient quality or quantity is not available. An emergency source may be placed on-line only after the Department's approval pursuant to a declaration of a state of water emergency under M.G.L. c. 21G, §§ 15 through 17 or as a requirement of a Department administrative order.

Enhanced Coagulation means the addition of sufficient coagulant for improved removal of disinfection byproduct precursors by conventional filtration treatment.

Enhanced Softening means the improved removal of disinfection byproduct precursors by precipitative softening.

Expand means to increase the yield of a well or wellfield above the approved pumping rate.

Filter Profile means a graphical representation of individual filter performance, based on continuous turbidity measurements or total particle counts versus time for an entire filter run, from startup to backwash inclusively, that includes an assessment of filter performance while another filter is being backwashed.

Filtration means a process for removing particulate matter from water by passage through porous media.

First Draw Sample means a one-liter sample of tap water, collected in accordance with 310 CMR 22.06B(1)(a)2. that has been standing in plumbing pipes at least six hours and is collected without flushing the tap.

Flocculation means a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable particles through gentle stirring by hydraulic or mechanical means.

Foreseeable Future means, for the purpose of demonstrating public water system capacity under 310 CMR 22.04, that a public water system has demonstrated its capacity to operate and maintain the system in compliance with 310 CMR 22.00 and each federal national primary drinking water regulations to be in effect five years from the date of the Department's determination of the system's capacity.

22.02: continued

GAC10 means granular activated carbon filter beds with an empty-bed contact time of ten minutes based on average daily flow and a carbon reactivation frequency of every 180 days.

Gross Alpha Particle Activity means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

Gross Beta Particle Activity means the total radioactivity due to beta particle emission as inferred from measurements on a dry sample.

Groundwater means all water that exists beneath the land surface in soils or geologic formations, specifically that part of the subsurface water in the saturated zone.

Ground Water Under the Direct Influence of Surface Water means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions.

Guidelines and Policies for Public Water Systems means the Department's Drinking Water Program's document titled "Guidelines and Policies for Public Water Systems," as amended, utilized by the Drinking Water Program as a guidance document. Copies of the "Guidelines and Policies for Public Water Systems" are available for a nominal fee from the State Bookstore, State House, Room 116, Boston, Massachusetts and 436 Dwight Street, Springfield, Massachusetts.

Haloacetic Acids (Five) (HAA5) means the sum of the concentrations in milligrams per liter of the haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid), rounded to two significant figures after addition.

Halogen means one of the chemical elements chlorine, bromine, or iodine.

Home Water Treatment Device means any apparatus, appliance, instrument, or product designed or used in conjunction with residential plumbing systems or systems providing water in any building or structure for human consumption or use; including but not limited to, apparatus, appliances, instruments, or products using filtration, distillation, absorption, ion exchange, reverse osmosis, or other treatment processes or technologies which alter the properties of water. This definition includes point-of-entry and point-of-use devices.

Inactive Source means an approved source(s) that is expected to be off-line for at least one year (12 months). A source may be deemed inactive only upon written approval of the Department. An inactive source may not return to active status without written approval from the Department. Monitoring as specified at 310 CMR 22.00, is not required during the time that the source is inactive, unless otherwise specified by the Department.

Initial Compliance Period means the first full three-year compliance period which begins at least 18 months after promulgation of the federal regulations.

Interim Wellhead Protection Area (IWPA) means that for public water systems using wells or wellfields that lack a Department approved Zone II, the Department will apply an interim wellhead protection area. This interim wellhead protection area shall be a one-half mile radius measured from the well or wellfield for sources whose approved pumping rate is 100,000 gpd or greater. For wells or wellfields that pump less than 100,000 gpd, the IWPA radius is proportional to the approved pumping rate which may be calculated according to the following equation: IWPA radius in feet = (32 x pumping rate in gallons per minute) + 400. A default IWPA radius or an IWPA radius otherwise computed and determined by the Department shall be applied to transient non-community (TNC) and non-transient non-community (NTNC) wells when there is no metered rate of withdrawal or no approved pumping rate.

22.02: continued

Laboratory Analyst means a person who is qualified to perform tests in specified disciplines or categories.

Laboratory Director means the person who has administrative and legal responsibility for the operation of the laboratory.

Laboratory Supervisor/Consultant means a person with management and technical responsibility, who exercises supervision over technical personnel, evaluates the quality of analytical methods, performs tests requiring special scientific skills and is responsible for the accuracy and reporting of results.

Large Water System, for the purpose of 310 CMR 22.06(B) means a water system that serves more than 50,000 persons.

Lead Service Line means a service line made of lead which connects the water main to the building inlet and any lead pigtail, gooseneck or other fitting that is connected to such lead line.

Legionella means a genus of bacteria, some species of which have caused a type of pneumonia called Legionnaires Disease.

Man-made Beta Particle and Photon Emitters means all radionuclides emitting beta particles and/or photons listed in Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure, NBS Handbook 69, except the daughter products of thorium-232, uranium-235 and uranium-238.

Maximum Contaminant Level or MCL means the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. The definition of Maximum Contaminant Level for the purpose of the consumer confidence report is contained in 310 CMR 22.16A(4)(c)2.

Maximum Contaminant Level Goal or MCLG: for the purpose of 310 CMR 22.16A(4)(C)1. means the level of a contaminant in drinking water at or below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL) means a level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. MRDLs are enforceable in the same manner as maximum contaminant levels under 310 CMR 22.00.

Maximum Residual Disinfectant Level Goal (MRDLG) means the maximum level of a disinfectant added for water treatment at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MRDLGs are nonenforceable health goals and do not reflect the benefit of the addition of the chemical for control of waterborne microbial contaminants.

Maximum Total Trihalomethane Potential means the maximum concentration of total trihalomethanes produced in a given water containing a disinfectant residual after seven days at a temperature of 25°C or above.

Medium-size Water System, for the purpose of 310 CMR 22.06B means a water system that serves greater than 3,300 and less than or equal to 50,000 persons.

Near the First Service Connection means at one of the 20% of all service connections in the entire system that are nearest the water supply treatment facility, as measured by water transport time within the distribution system.

New Source means any existing, proposed, or expanded use of a water source in a public water system that has not met the requirements of guidelines and regulations utilized by the Drinking Water Program.

22.02: continued

New Source Approval Process means the step by step process utilized by the Department's Drinking Water Program culminating in the development of water for a public water system.

Nonzoning Controls means by-laws, ordinances, rules and regulations, other than zoning controls, adopted in accordance with the constitutional and statutory powers of cities and towns to protect the health, safety and general welfare of their present and future inhabitants.

On-line means a well, wellfield or surface water source from which water currently is being pumped or drawn for use in a public water system.

Optimal Corrosion Control Treatment means, for the purpose of 310 CMR 22.06B only, the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while insuring that the treatment does not cause the water system to violate any national primary drinking water regulations.

Performance Evaluation Sample means a reference sample provided to a laboratory for the purpose of demonstrating that the laboratory can successfully analyze the sample within limits of performance set by the Department.

Person means an individual, corporation, company, association, trust, partnership, the Commonwealth, a municipality, district or other subdivision or body politic of the Commonwealth, any department, agency, or instrumentality of the United States, except that nothing herein shall be construed to refer to or include any American Indian tribe, or the United States Secretary of the Interior in his capacity as trustee of Indian lands.

Picocurie (pCi) means that quantity of radioactive material producing 2.22 nuclear transformations per minute.

Point of Disinfectant Application is the point where the disinfectant is applied and water downstream of that point is not subject to recontamination by surface water runoff.

Point-of-entry Treatment Device (POE) means a device installed to treat the water entering a house or building or portion of such for the purpose of reducing contaminants in the water distributed throughout the house or building or portion of such.

Point-of-use Treatment Device (POU) means a treatment device installed on a single faucet or spigot used for the purpose of reducing contaminants in drinking water at that one faucet or spigot.

Primary Operator means a person who is certified by the Board of Certification of Drinking Water Supply Facilities and has a grade certificate equal to the class of the corresponding facility at which he or she is employed. The Primary Operator shall be the individual who has direct supervision and responsibility for charge of the operation of a facility such as the superintendent or chief plant operator who has active field supervision of the operation of the facility or who is required in the performance of their normal duties to give responsible, technical advice and supervision of the technical aspects rather than only general administrative supervision of the treatment and/or distribution of the water supply and spends their working hours at the treatment facility or performing distribution system duties and is knowledgeable of the Massachusetts Drinking Water Regulations, guidelines and policies. The Primary Operator of the facility shall hold a "Full Operator" status and cannot hold an "Operator-in-Training" certificate as defined in 236 CMR 4.05.

Public Water System means a system for the provision to the public of water for human consumption, through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days of the year. Such term includes (1) any collection, treatment, storage, and distribution facilities under control of the operator of such a system and used primarily in connection with such system, and (2) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. The Department may presume that a system is

22.02: continued

a public water system as defined herein based on the average number of persons using a facility served by the system or on the number of bedrooms in a residential home or facility. Any public water system that has one or more wells located on commonly owned property, including wells located on any contiguous property determined by the Department to be held in same common ownership, that individually may serve less than 25 people, but collectively serve more than 25 people for more than 60 days of the year constitutes a public water system under this definition. A public water system includes a "community water system" or a "non-community water system".

(a) Community Water System means a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

(b) Non-community Water System means a public water system that is not a community water system.

1. Non-transient Non-community Water System or "NTNC" means a public water system that is not a community water system and that has at least 15 service connections or regularly serves at least 25 of the same persons or more approximately four or more hours per day, four or more days per week, more than six months or 180 days per year, such as a workplace providing water to its employees.
2. Transient Non-community Water System or TNC means a public water system that is not a community water system or a non-transient non-community water system but is a public water system which has at least 15 service connections or serves water to 25 different persons at least 60 days of the year. Some examples of these types of systems are: restaurants, motels, camp grounds, parks, golf courses, ski areas and community centers.

Public Water System Capacity means a public water system has the technical, financial, and managerial ability to operate in compliance with 310 CMR 22.00, the Department's "Guidelines and Policies for Public Water System" and each National Primary Drinking Water Regulation in effect at the time of such approval and in the foreseeable future

Reliably and Consistently below the MCL means that though a system detects contaminants in its water supply, it has sufficient knowledge of the source or extent of the contamination to predict that the MCL would not be exceeded in the future. Wide variations in an analytical results or an analytical results which is close to the MCL are examples of situations where systems would not meet the "reliably and consistently" test.

Rem means the unit of dose equivalent from ionizing radiation to the total body or any internal organ or organ system. A "millirem (mrem)" is 1/1000 of a rem.

Repeat Compliance Period means any subsequent compliance period after the initial compliance period.

Replacement Well means a new well(s)/wellfield installed to replace or supplement an approved well(s)/wellfield where the proposed new well(s)/wellfield will be situated within 250 feet of the original well(s)/wellfield and have a pumping rate equal to or less than that of the original well(s)/wellfield. Replacement wells must be installed in the same unconsolidated geologic formation as the original approved well(s)/wellfield. Criteria used to determine location of replacement wells shall include but not be limited to the following: extent to which negative environmental impacts caused by the existing well can be minimized; degree to which replacement wells alter the existing groundwater hydraulics or Zone II boundaries; and the degree to which significant potential contamination threats can be lessened. Replacement wells shall not significantly alter the existing groundwater hydraulics or Zone II boundaries. Replacement wells are subject to the new source requirements as deemed applicable by the Department.

Residual Disinfectant Concentration ("C" in CT calculations) means the concentration of disinfectant measured in mg/l in a representative sample of water.

River Source means a drinking water source with a direct intake located at any river or stream that is designated as a drinking water source in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00. Protected Zones A, B, and C, as defined herein, do not apply to river sources designated as Class B under 314 CMR 4.00.

22.02: continued

Sampling Point means the entry point to the distribution system that represents each source after treatment.

Sanitary Survey means an on site review of the water sources, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.

Saturated Zone means a zone in which all voids, large and small, are filled with water under pressure, equal to or greater than atmospheric pressure.

Secondary Maximum Contaminant Level (SMCL) means standards which apply to public water systems and which in the judgement of the Administrator or the Department, are requisite to protect the public welfare. The SMCL is the maximum permissible level of a containment in water, which is delivered to the free flowing outlet of the ultimate user of a public water system. Contaminants added to the water under circumstances controlled by such user, except those resulting from corrosion of piping and plumbing caused by water qualify, are excluded from this definition. The Department may require a public water system to comply with secondary maximum contaminant levels to protect public health and to discourage persons served by the public water system from discontinuing their use of drinking water from public water systems.

Secondary Operator means a person who is certified by the Board of Certification of Operators of Drinking Water Supply Facilities and has an operator's license not less than one grade lower than the classification of the facility at which they are employed. For Class III treatment facilities or higher, the Secondary Operator must also have at least six months working experience in a Class II treatment facility or higher. A Secondary Operator shall be an individual who spends their working hours at the treatment facility as the shift supervisor or performs distribution system duties as a foreman or assistant superintendent and is knowledgeable of 310 CMR 22.00: *Drinking Water*, guidelines and policies. A Secondary Operator shall be in direct responsible charge during periods of time when the Primary Operator is temporarily absent or is not scheduled for duty. The Secondary Operator may hold an Operator-in-Training certificate as defined in 236 CMR 1.00 through 5.00.

Sedimentation means a process for removal of solids before filtration by gravity or separation.

Service Line Sample means a one-liter sample of water, collected in accordance with 310 CMR 22.06B(7) has been standing for at least six hours in a service line.

Single Family Structure, for the purpose of 310 CMR 22.06B only, means a building constructed as a single-family residence that is currently used as either a residence or a place of business.

Slow Sand Filtration means a process involving passage of raw water through a bed of sand at low velocity (generally less than 0.4 m/h) resulting in substantial particulate removal by physical and biological mechanisms.

Small Water System, for the purpose of 310 CMR 22.06B, means a water system that serves 3,300 persons or fewer.

Spring means a natural discharge point where groundwater issues from soil or rocks in concentrated flow. Public water supply springs will be perennial or intermittent springs of nonthermal origin. A source is not considered a spring if mechanical methods are used to enhance the flow of water.

Standard Sample means the aliquot of finished drinking water that is examined for the presence of coliform bacteria.

Substantial Modification means any deviation from approved plans or specifications affecting capacity, hydraulic conditions, operating units, the functioning of water treatment processes or systems, or the quality of water delivered to consumers. This definition does not apply to substantial modifications as that term is used in 310 CMR 22.22.

22.02: continued

Supplier of Water means any person who owns or operates a public water system.

Surface Water means all water that is open to the atmosphere and subject to surface runoff.

Surface Water Source means any lake, pond, reservoir, river, stream or impoundment designated as a public water supply in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00.

SUVA means Specific Ultraviolet Absorption at 254 nanometers (nm), an indicator of the humic content of water. It is a calculated parameter obtained by dividing a sample's ultraviolet absorption at a wavelength of 254 nm (UV_{254}) (in m^{-1}) by its concentration of dissolved organic carbon (DOC) (in mg/l).

System with a Single Service Connection means a system that supplies drinking water to consumers via a single service line.

Tier 1 Public Notice means a public notice required for 310 CMR 22.00 violations and situations with significant potential to have serious adverse effects on human health as a result of short-term exposure.

Tier 2 Public Notice means a public notice required for 310 CMR 22.00 violations and situations with potential to have serious adverse effects on human health.

Tier 3 Public Notice means a public notice for all other 310 CMR 22.00 violations and situations not included in Tier 1 and Tier 2.

Too Numerous to Count (TNTC) means that the total number of bacterial colonies exceeds 200 on a 47-mm diameter membrane filter used for coliform detection.

Total Organic Carbon (TOC) means total organic carbon in mg/l measured using heat, oxygen, ultraviolet irradiation, chemical oxidants, or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to two significant figures.

Total-Trihalomethanes (TTHM) means the sum, rounded to two significant figures, of the concentrations in milligrams per liter of the trihalomethane compounds, trichloromethane (chloroform), bromodichloromethane, dibromochloromethane, and tribromomethane (bromoform).

Treatment Technique (TT) means, as defined in 310 CMR 22.16A(4)(e)1., a required process intended to reduce the level of a contaminant or other constituent in drinking water.

Tributary means any body of running, or intermittently running, water which moves in a definite channel, naturally or artificially created, in the ground due to a hydraulic gradient, and which ultimately flows into a Class A surface water source, as defined in 314 CMR 4.05(3)(a).

Trihalomethane means one of the family of organic compounds, named as derivatives of methane, wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure.

Uncovered Finished Water Storage Facility is a tank, reservoir, or other facility used to store water that will undergo no further treatment except residual disinfection and is open to the atmosphere.

Variances and Exemptions means, as defined in 310 CMR 22.16A(4)(d)1., permission by the Department or EPA not to meet an MCL or a treatment technique under certain conditions

Virus means a virus of fecal origin which is infectious to humans by waterborne transmission.

Waterborne Disease Outbreak means the significant occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment, as determined by the Department in conjunction with the Massachusetts Department of Public Health.

22.02: continued

Water Used For Human Consumption means water that is used by humans in residential, commercial, industrial, institutional or other setting for drinking, bathing, showering, cooking, dishwashing, or maintaining oral hygiene.

Watershed means the area contained within geomorphic or topographic boundaries of higher elevations which cause surface water and/or groundwater to drain or flow to lower elevations into water used as a public water system source.

Wellfield means a series of three or more wells that are manifolded together. The wells can either be suction lifted or individually pumped. Pump intake depths shall be no greater than 28 feet below ground level (bgl). A maximum distance of 50 feet shall be permitted between wells.

Zoning Controls means by-laws and ordinances adopted by cities and towns in accordance with M.G.L. c. 40A.

Zone A means

(a) the land area between the surface water source and the upper boundary of the bank;

(b) the land area within a 400 foot lateral distance from the upper boundary of the bank of a Class A surface water source, as defined in 314 CMR 4.05(3)(a); and

(c) the land area within a 200 foot lateral distance from the upper boundary of the bank of a tributary or associated surface water body.

Zone B means the land area within ½ mile of the upper boundary of the bank of a Class A surface water source, as defined in 314 CMR 4.05(3)(a), or edge of watershed, whichever is less. However, Zone B shall always include the land area within a 400-foot lateral distance from the upper boundary of the bank of the Class A surface water source.

Zone C means the land area not designated as Zone A or B within the watershed of a Class A surface water source as defined at 314 CMR 4.05(3)(a).

Zone I means the protective radius required around a public water supply well or wellfield. For public water system wells with approved yields of 100,000 gpd or greater, the protective radius is 400 feet. Tubular wellfields require a 250-foot protective radius. Protective radii for all other public water system wells are determined by the following equation: Zone I radius in feet = (150 x log of pumping rate in gpd) - 350. This equation is equivalent to the chart in the Guidelines and Policies for Public Water Systems. A default Zone I radius or a Zone I radius otherwise computed and determined by the Department shall be applied to transient non-community (TNC) and non-transient non-community (NTNC) wells when there is no metered rate of withdrawal or no approved pumping rate.

Zone II means that area of an aquifer that contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation). It is bounded by the groundwater divides that result from pumping the well and by the contact of the aquifer with less permeable materials such as till or bedrock. In some cases, streams or lakes may act as recharge boundaries. In all cases, Zone II shall extend upgradient to its point of intersection with prevailing hydrogeologic boundaries (a groundwater flow divide, a contact with till or bedrock, or a recharge boundary). The Zone II must include the entire Zone I area. For springs, the Zone II is that area of an aquifer, which contributes water to the spring under naturally flowing conditions.

Zone III means that land area beyond the area of Zone II from which surface water and groundwater drain into Zone II. The surface drainage area as determined by topography is commonly coincident with the groundwater drainage area and will be used to delineate Zone III. In some locations, where surface and groundwater drainage is not coincident, Zone III shall consist of both the surface drainage and the groundwater drainage areas.

(2) Definitions as Related to Cross Connections. As used in 310 CMR 22.22, unless the context indicates otherwise, the following words shall have the following meanings:

22.02: continued

Air Gap Separation means the method of preventing backflow through the use of an unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of the receptacle. The air gap separation shall be at least twice the internal diameter of the supply pipe discharge line but in no case less than one inch.

Approved Backflow Prevention Device or Device means a testable or non-testable cross connection control device that is approved by the Department for use in Massachusetts.

Approved Examiner means an individual authorized in writing by the Department to administer written and practical certification examinations at a recognized training institution.

Atmospheric Vacuum Breaker means an approved backflow device used to prevent back siphonage which is not designed for use under static line pressure.

Audit means a review of a Public Water System's implementation of its cross connection program to evaluate its effectiveness in distributing safe drinking water.

Back Pressure means pressure created by mechanical means or other means which causes water or other liquids or substances to flow or move in a direction opposite to that which is intended.

Back Siphonage means a form of backflow due to reduced or sub-atmospheric pressure within a water system.

Backflow means the flow of water or other liquids, mixtures or substances into the distribution pipes of a potable water supply from any source other than the intended source.

Backflow Preventer with Intermediate Atmospheric Vent means a non testable device having two independently operating check valves separated by an intermediate chamber with a means for automatically venting it to the atmosphere, in which the check valves are force loaded to a normally closed position and the venting means is forced loaded to a normally open position.

Barometric Loop means a loop of pipe rising at least 35 feet, at its topmost point, above the highest fixture it supplies for the protection of back siphonage.

Certification Examination means an examination approved by the Department for the purpose of testing competency in all areas of cross connection control and backflow prevention device testing.

Certified Backflow Prevention Device Tester means an individual who holds a valid Massachusetts Backflow Prevention Device Tester's Certificate issued by the Department.

Contaminant means any physical, chemical, biological or radiological substance or matter in water.

Cross Connection means any actual or potential physical connection or arrangement between a pipe conveying potable water from a public water system and any non-potable water supply, piping arrangement or equipment including, but not limited to, waste pipe, soil pipe, sewer, drain, other unapproved sources.

Cross Connection Program Plan means a plan submitted to the Department by the water supplier describing the current and proposed cross connection program and including information on staffing, training, testing, surveying, fee structure, etc.

Cross Connection Violation Form means a violation form which is sent to the owner by the water supplier with copies to the plumbing inspectors and Board of Health delineating cross connection violations found on the owner's premises and a procedure for corrective action.

22.02: continued

Department's Designee or Designee means any water supplier to whom, upon written request of said water supplier, the Department delegates any portion of its authority to act under 310 CMR 22.22.

Design Data Sheet means a report form submitted to the Department or its Designee along with plans for each installation of a reduced pressure backflow preventer or double check valve assembly, or for each change to any such device already installed, describing and showing the details of the specific installation.

Double Check Valve Assembly means a Department approved testable backflow prevention device that incorporates an assembly of check valves, with shut-off valves at each end and appurtenances for testing.

Health Hazard means an actual or potential threat of contamination to the potable water in a public water system, which, in the opinion of the Department or its Designee would endanger health.

In-Plant Protection means the location of approved backflow prevention devices in a manner, which provides protection of the consumers of water and the potable water system within the premises.

Inspection means an on-site inspection and survey by a qualified individual to determine the existence and location of cross connections and/or the physical examination and testing of an installed backflow prevention device to verify that the backflow prevention device is functioning properly.

Inspection and Maintenance Report Form means a report form, designated by the Department, which is to be used by certified testers to record all pertinent testing information.

Owner means any person maintaining a cross connection installation or owning or occupying premises on which cross connections can or do exist.

Owner's Agent means any person or body designated by the owner to act as his or her representative.

Potable Water means water from any source that has been approved by the Department for human consumption.

Pressure Vacuum Breaker means an approved backflow prevention device designed to prevent only back siphonage and which is designed for use under static line pressure.

Reduced Pressure Backflow Preventer means an approved testable backflow prevention device incorporating:

(a) two or more check valves,
(b) an automatically operating differential relief valve located between the two checks,
(c) two shut-off valves, and
(d) necessary appurtenances for testing; and which is designed to operate so that:
    1. the pressure in the zone between the two check valves is maintained at a value less than the pressure on the public water system side of the device and
    2. at cessation of normal flow, the pressure in the zone between the two check valves is maintained at a value less than the pressure on the public water system side of the device, and
    3. in the case of leakage of either check valve, the differential relief valve shall operate to maintain reduced pressure in the zone by discharging to the atmosphere.

Reviewing Authority means the Department, its Designee, or the local plumbing inspector, authorized by M.G.L. c. 142 and licensed by the Board of State Examiners of Plumbers and Gas Fitters, whichever is responsible for the review and approval of the installation of an approved backflow prevention device.

22.02: continued

Unapproved Source means the source or distribution system for any water or other liquid or substance which has not been approved by the Department as being of safe and sanitary quality for human consumption, including but not limited to any waste pipe, soil pipe, sewer, drain, or non-acceptable potable water system material.

22.03: Compliance

(1) No source of water used by a public water system, no system of water supply used by a public water system, and no treatment facilities or treatment works used by a public water system shall be deemed by the Department to be safe, fit, or pure, or in any other way approved, and shall not be used either for regular or emergency use, unless the drinking water supplied to the users of such public water system complies with 310 CMR 22.00.

(a) Failure to comply with 310 CMR 22.00 constitutes a violation.

(b) For any violation of 310 CMR 22.00, when so determined by the Department, the Department may set a schedule for compliance within an Administrative Consent Order or other enforceable document with specific interim measures that the supplier of water must take. Failure to meet the schedule or interim measures constitutes a violation of 310 CMR 22.00.

(2) The Department may require a public water system to sample and analyze its water for any parameter at any location and frequency which the Department deems necessary to ascertain the purity of water and fitness of a system to ensure the delivery of a fit and pure water supply to all consumers. The Department may presume that a public water system that has failed to report monitoring results to the Department in accordance with 310 CMR 22.00 has failed to conduct such monitoring.

(3) 310 CMR 22.00 shall apply to every public water system in the Commonwealth, except a consecutive public water system which demonstrates to the Department's satisfaction that it meets all the following Criteria:

(a) The consecutive system consists only of distribution and storage facilities (and does not have any collection and treatment facilities);

(b) The consecutive system obtains all of its water from but is not owned by or operated by, a public water system which is subject to 310 CMR 22.00;

(c) The consecutive system does not sell water to any person;

(d) The consecutive system is not a carrier which conveys passengers in commerce; and

(e) The consecutive system and the supplying system have entered into a written agreement that addresses the status and responsibilities of the parties for the ownership, operation and maintenance of the combined system, including but not limited to, drinking water sources, treatment facilities, distribution system, storage and water quality sampling.

(4) If the Department determines that a consecutive public water system is exempt from 310 CMR 22.00 based on the consecutive system meeting the criteria in 310 CMR 22.03(3)(a) through (e), the supplying system shall thereafter be responsible for the compliance of the combined system with 310 CMR 22.00, including the requirement to obtain the Department's approval for a substantial modification to an existing public water system pursuant to 310 CMR 22.04.

(5) Where the Department, in consultation with the Department of Public Health, determines that (1) a supplier of water is supplying drinking water in violation of 310 CMR 22.00, and (2) an order to cease supplying such water would pose a significantly greater hazard to the public health than the continued supplying of such water in violation of 310 CMR 22.00, the Department may authorize the supplying of such water subject to such conditions as may be imposed by the commissioner, but only for a temporary, non-renewable period not to exceed the amount of time the supplier of water reasonably needs to either eliminate the violation or promptly apply for and obtain a variance or exemption.

(6) The Department shall report all violations of 310 CMR 22.00 to the Massachusetts Department of Public Health promptly upon obtaining knowledge of such violations, and shall consult with the Massachusetts Department of Public Health with regard to enforcement actions taken to obtain compliance with 310 CMR 22.00.

22.03: continued

(7) No person shall violate, or cause to be violated, any local zoning or nonzoning control that is a requirement of an approved wellhead protection plan or a watershed protection/control program.

(8) In the event the Department finds on the basis of a health assessment made by the Department's Office of Research and Standards that the level of any contaminant found in water collected within the distribution system and/or at the sampling point at the entry to the distribution system, pose an unacceptable health risk to consumers, acting alone or in combination with other contaminants, public water system shall take appropriate actions to reduce the level of contaminant concentrations to levels the Department deems safe or remove the source of supply from service by the deadline specified by the Department. The supplier of water shall be required to monitor the source as directed by the Department, provide public notification and notify the Department of the actions it intends to take in response to a finding that a source of supply poses an unacceptable risk to health.

(9) Schedule for Compliance.

(a) No supplier of water may violate, or cause to be violated, any treatment technique requirement established by 310 CMR 22.20A. A supplier of water subject to one or more treatment technique requirements must take appropriate action to timely come into compliance with each such requirement. The Department may require a supplier of water to notify the Department of the actions it intends to take to come into compliance with each treatment technique requirement. Each such notice must include, at a minimum, a schedule that includes the dates by which the supplier of water will hire a professional engineer to prepare plans and specifications, submit draft and final design plans and specifications to the Department for approval, request bids for construction, award a contract for construction, and commence and complete construction of the work necessary.

(b) If an extension is required to meet an action level, treatment technique, or other requirement established by 310 CMR 22.00, the Department will set a schedule for compliance with an Administrative Consent Order or other enforceable document and may specify any interim measures that the supplier of water must take. Failure to meet the schedule or interim measures constitutes a violation of 310 CMR 22.00.

(10) All water quality data submitted to the Department shall be analyzed by a laboratory certified pursuant to 310 CMR 42.00 unless otherwise specified by the Department. All water quality data for contaminants listed in 310 CMR 22.00, including additional and voluntary samples, shall be submitted to the Department, unless otherwise specified by the Department.

(11) The Department may require that special purpose samples collected by the public water system and analyzed by a certified laboratory using approved methods as specified at 310 CMR 42.00 be used to determine compliance with the applicable MCL.

(12) A public water system is in operation during the period the system is providing (pumping or gravity feeding) water to the water distribution system and/or the public water system is providing water to at least one of its service connections or customers.

(13) All data or information submitted or reported to the Department must be in the format and manner as specified and approved by the Department.

22.04: Construction, Operation and Maintenance of Public Water Systems

(1) New or Substantially Modified Public Water Systems. Any person proposing to construct a new public water system, operate a public water system or to substantially modify an existing public water system shall obtain the prior written approval of the Department and shall comply with the following requirements:

(a) Minimum Criteria: Such person(s) shall demonstrate to the Department's satisfaction that:

1. the drinking water source for the system meets the criteria in 310 CMR 22.20A, 310 CMR 22.20B, and 310 CMR 22.20C, and 310 CMR 22.21, as applicable, and complies with the Department's "Guidelines and Policies for Public Water System";

22.04: continued

2. the storage, treatment and distribution system and facilities including transmission lines for the system have been sited, designed, constructed and in compliance with 310 CMR 22.19, 310 CMR 22.20A, 310 CMR 22.22 and the Department's "Guidelines and Policies for Public Water Systems";

3. the public water system has the technical, managerial and financial capacity to operate and maintain the system in compliance with 310 CMR 22.00 and each National Primary Drinking Water Regulation in effect at the time of the Department's determination of the system's capacity and in effect in the foreseeable future;

4. the public water system is in compliance with the Department's "Guidelines and Policies for Public Water Systems," in effect at the time of the Department's determination of the system's capacity;

5. the public water system manager has attended a capacity training program approved by the Department or shall attend such a program if deemed necessary by the Department;

6. in the case of transient non-community public water systems or any other public water system, if deemed necessary by the Department, a notice has been or shall be recorded on the deed of the property where a drinking water source serving such public water system is located, stating that such property contains a drinking water source subject to 310 CMR 22.00.

7. the staffing of the public water system complies with 310 CMR 22.11B and any related policies established by the Department or the Board of Certification of Operators of Drinking Water Supply Facilities.

(2) To the extent practicable, said person shall avoid locating all or any part of a new or substantially modified facility at a site which:

NON-TEXT PAGE

22.04: continued

(a) is subject to a significant risk from earthquakes, floods, fires, or other disasters which could cause a breakdown of the public water system or a portion thereof;
(b) except for intake structures, is within the floodplain of a 100-year flood or is lower than any recorded high tide where appropriate records exist; and can reasonably obtain service from an existing system (the Department shall consider proximity to existing systems and the economic feasibility of extending service).

(3) Information Required for Department Approval. Persons seeking the Department's approval under 310 CMR 22.04(1), shall submit the following information:
(a) all necessary plans, specifications, standard operating, maintenance procedures, and proposed staffing for the system, prepared by a Massachusetts registered professional engineer unless otherwise determined by the Department;
(b) documentation, including but not limited to, a water system business plan, which demonstrates that the public water system complies with the capacity requirements in 310 CMR 22.04(1)(a)3.; and
(c) any additional information that the Department deems relevant to its review and approval.

(4) Prohibition on Construction or Substantially Modification of a Public Water System Without Prior Department Approval. No person shall commence construction or otherwise implement or operate a proposed new public water system or make substantial modifications to an existing public water system unless the Department has issued its prior written approval and any other applicable Department permits.

(5) Existing Public Water Systems. The Department may require any existing public water system to demonstrate its compliance with 310 CMR 22.00, including but not limited to 310 CMR 22.04(1) and the Department's Guidelines and Policies for Public Water System, at the time of a sanitary survey conducted pursuant to 310 CMR 22.04(12) or as otherwise directed by the Department.

(6) By No Later than December 31, 2001, all public water systems shall install meter(s) at location(s) sufficient to record each system's total production of water from all sources, including water purchased from and/or water sold to other public water systems

(7) Each supplier of water shall operate and maintain its system in a manner that ensures the delivery of safe drinking water to consumers. In determining whether a supplier of water is properly operating and maintaining a public water system, the Department will apply the standards for public water systems set forth in the Drinking Water Program's "Guidelines and Policies for Public Water Systems,"

(8) New Product or Technology.
(a) No supplier of water shall add, install or use any chemicals, drinking water additives, or treatment devices or equipment that come into direct contact with drinking water, unless such devices or equipment have received the prior written approval of the Department.
(b) To obtain the Department's approval and placement on the new technology approval list, a manufacturer shall demonstrate that the product or technology:
1. conforms to the applicable ANSI/NSF Standard 60 or 61; or
2. was approved by EPA prior to April 1990 and conforms to the standards of the American Water Works Association; or
3. has been field tested by an independent testing laboratory to the Department's satisfaction; or
4. has performed to the Department's satisfaction during a Department approved pilot study.
(c) Persons seeking to have a product or technology listed are directed to follow the procedures set forth in the Drinking Water Program's policy entitled: "New Product or Technology Review Policy" DWP Policy No. 89-01, a copy of which is available from the Drinking Water Program. The Department may revoke its approval of a product or technology if it determines that the product or technology is defective or performs inadequately in the field.

22.04: continued

(d) If the drinking water chemicals or coatings have NSF certification, a NSF certification shall also be required of the original producer of the product. Repackers of chemicals are not required to be formally certified, but shall self-certify to the Department that the cleanliness of their procedures and purity of the resultant product is equivalent to the standards applicable to the original manufacturer. Any local reformulation of chemical requires certification in accordance with NSF 60.

(e) Any public or private entity providing the testing and certification described in 22.04(6)(b) for other parties shall be certified by the American National Standards Institute (ANSI).

(9) Pilot Requirements. The Department may require persons seeking approval of a disinfection or filtration treatment system or process for use in a public water system to perform a pilot study to determine whether the proposed system or process will perform adequately in the field. Persons required to perform such a study should follow the procedures set forth in the Division's policy entitled "Pilot Study Requirements for Proposed Surface Water Treatment/Filtration Plants," DWS Policy No. 90-04, a copy of which is available from the Drinking Water Program.

(10) Treatment Techniques for Acrylamide and Epichlorohydrin: Each supplier of water using acrylamide or epichlorohydrin in a public water system shall certify annually in writing annually to the Department (using third party or manufacturer's certification) that the combination (or product) of dose and monomer level does not exceed the levels specified as follows:

Acrylamide = 0.05% dosed at 1 ppm (or equivalent)

Epichlorohydrin = 0.01% dosed at 20 ppm (or equivalent)

Such certifications shall be made by the manufacturers or third parties, as approved by the Department.

(11) Any application of a herbicide to any surface waterbody that serves as a source of water for a public water system shall comply with 310 CMR 22.20B(8).

(12) Sanitary Surveys. The Department or its agent shall conduct sanitary surveys of community and NTNC public water systems to evaluate each system's source, facilities, equipment, operation, monitoring schedule, technical, managerial and financial capacity, and maintenance procedures at a frequency determined by the Department.

(a) If any violation of 310 CMR 22.00, M.G.L. c. 111, § 160 or any other statute or regulations administered by the Department is found, including deficiencies related to system capacity, the public water system shall be notified of the violation, the action necessary to comply with the statute or regulations, and the time period within which compliance must be attained. The Public Water System must respond to sanitary survey deficiencies within 45 days from the receipt of the survey report.

(b) The owner of a Transient Non-Community Water Systems (TNC) shall be responsible for conducting or having a sanitary survey conducted by June 29, 1999 to evaluate the system's source, facilities, equipment, operation, monitoring schedule and maintenance plan. Thereafter, TNC systems shall undergo another sanitary survey every five years in accordance with the Department requirements. The survey information shall be submitted to the Department on a form provided by the Department for such use no later than 90 days after the completion of the survey. The Department will review the results of each sanitary survey to determine whether the existing monitoring frequency is adequate and what additional measures, if any, the TNC system needs to undertake to improve drinking water quality. In conducting the survey the public water system shall be subject to 310 CMR 22.04(9)(a), except that the Department may conduct a survey of the TNC system at any time to determine compliance with 310 CMR 22.00.

22.05: Maximum Microbiological Contaminant Levels, Monitoring Requirements and Analytical Methods

(1) Routine Coliform Monitoring.

(a) Each supplier of water shall collect total coliform samples at sites which are representative of water throughout the distribution system, at the entry point to the distribution system, and at storage facilities as determined by the Department. A raw water source sample shall be collected monthly if the water at the entry point to the distribution system is not representative of the source. All samples must be taken at sites according to a written sample site plan unless otherwise authorized by the Department in writing. These plans are subject to review, revision and approval by the Department. Systems that do not treat their sources and are under 3,300 population are exempt from the raw water-sampling requirement. A total coliform positive raw water-sample shall not trigger the requirements of 310 CMR 22.05(2).

(b) The monitoring frequency for total coliform for community water systems is based on the population served by the system according to Table 1-22.05. If a community water system serving 25 to 1,000 persons has no history of total coliform contamination in its current configuration and a sanitary survey conducted in the past five years shows that the system is supplied solely by a protected groundwater source and is free of sanitary defects, the Department may reduce the monitoring frequency specified in Table 1-22.05, in writing, to not less than one sample per quarter.

Table 1-22.05
TOTAL COLIFORM MONITORING FREQUENCY
FOR COMMUNITY WATER SYSTEMS

Population served	Minimum number of samples per month
25 to 1,000[1]	1
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240
780,001 to 970,000	270
970,001 to 1,230,000	300
1,230,001 to 1,520,000	330
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450
3,960,001 or more	480

[1] Includes public water systems which have at least 15 service connections, but serve fewer than 25 persons.

22.05: continued

(c) The minimum monitoring frequency for total coliform for non-community water systems is as follows:

1. A non-community water system using only ground water (except ground water under the direct influence of surface water, as defined in 310 CMR 22.02) and serving 1,000 persons or fewer must monitor each calendar quarter that the system provides water to the public.

2. A non-community water system using only ground water (except ground water under the direct influence of surface water, as defined in 310 CMR 22.02) and serving more than 1,000 persons during any month must monitor at the same frequency as a like-sized community water system, as specified in 310 CMR 22.05(1)(b), except the Department may reduce this monitoring frequency, in writing, for any month the system serves 1,000 persons or fewer to no less than once per quarter. For systems using ground water under the direct influence of surface water, 310 CMR 22.05(1)(c)4. applies.

3. A non-community water system using surface water, in total or in part, must monitor at the same frequency as a like-sized community water system, as specified in 310 CMR 22.05(1)(b), regardless of the number of persons it serves.

4. A non-community water system using ground water under the direct influence of surface water, as defined in 310 CMR 22.02 must monitor at the same frequency as a like-sized community water system, as specified in 310 CMR 22.05(1)(b). The system must begin monitoring at this frequency beginning six months after the Department determines that the ground water is under the direct influence of surface water.

(d) A public water system must collect samples at regular time intervals throughout the month, except that a system which uses ground water (except ground water under the direct influence of surface water, as defined in 310 CMR 22.02) and serves 4,900 persons or fewer, may collect all required samples on a single day if they are taken from different sites.

(e) A public water system that uses surface water or ground water under the direct influence of surface water, as defined in 310 CMR 22.02, does not provide filtration in compliance with 310 CMR 22.20A, and is seeking to avoid filtration, must collect at least one sample near the first service connection each day the turbidity level of the source water, measured as specified in 310 CMR 22.20A(5)(b)2. exceeds 1 NTU. This sample must be analyzed for the presence of total coliform. When one or more turbidity measurements in any day exceeds 1 NTU, the system must collect this coliform sample within 24 hours of the first exceedance, unless the Department determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection. Sample results from this coliform monitoring must be included in determining compliance with the MCL for total coliform in 310 CMR 22.05(8).

(f) Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for total coliform in 310 CMR 22.05(8). Repeat samples taken pursuant to 310 CMR 22.05(2) are not considered special purpose samples, and must be used to determine compliance with the MCL for total coliform in 310 CMR 22.05(8).

(2) Repeat Monitoring.

(a) If a routine sample is total coliform-positive, the public water system must collect a set of repeat samples within 24 hours of being notified of the positive result. A system that collects more than one routine sample/month must collect no fewer than three repeat samples for each total coliform-positive sample found. A system that which collects one routine sample/month or fewer must collect no fewer than four repeat samples for each total coliform-positive sample found. The Department may extend the 24-hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control.

(b) The system must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one repeat sample at a tap within five service connections upstream and at least one repeat sample at a tap within five service connections downstream of the original sampling site. If a total coliform-positive sample is at the end of the distribution system, or one away from the end of the distribution system, the Department may waive the requirement to collect at least one repeat sample upstream or downstream of the original sampling site.

22.05: continued

(c) The system must collect all repeat samples on the same day, except that the Department may allow a system with a single service connection or distribution tap to collect a repeat sample of 200 ml on each of two consecutive days.

(d) If one or more repeat samples in the set is total coliform-positive, the public water system must collect an additional set of repeat samples in the manner specified in 310 CMR 22.05(2)(a) through 310 CMR 22.05(2)(c). The additional samples must be collected within 24 hours of being notified of the positive result, unless the Department extends the limit as provided in 310 CMR 22.05(2)(a). The system must repeat this process until either total coliforms are not detected in one complete set of repeat samples or the system determines that the MCL for total coliform in 310 CMR 22.05(8) has been exceeded and notifies the Department in accordance with 310 CMR 22.15.

(e) If a system collecting fewer than five routine samples/month has one or more total coliform-positive samples and the Department does not invalidate the sample(s) under 310 CMR 22.05(3), it must collect at least five routine samples during the next month the system provides water to the public, except that the Department may waive this requirement if the conditions of 310 CMR 22.05(2)(e)1. or 310 CMR 22.05(2)(e)2. are met. The Department cannot waive the requirement for a system to collect repeat samples in 310 CMR 22.05(2)(a) through 310 CMR 22.05(2)(d).

1. The Department may waive the requirement to collect five routine samples the next month the system provides water to the public if the Department or an agent approved by the Department performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the Department to determine whether additional monitoring and/or any corrective action is needed. An employee of the system must not conduct this site visit.

2. The Department may waive the requirement to collect five routine samples the next month the system provides water to the public if the Department has determined why the sample was total coliform-positive and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. In this case, the Department will document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the Department official who recommended the decision, and make this document available to the EPA and public. The written documentation will describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem. The Department will not waive the requirement to collect five routine samples the next month the system provides water to the public solely because all repeat samples are total coliform-negative. Under 310 CMR 22.05(2)(e)2., a system must still take at least one routine sample before the end of the next month it serves water to the public and use it to determine compliance with the MCL for total coliform in 310 CMR 22.05(8) unless the Department has determined that the system has corrected the contamination problem before the system took the set of repeat samples required in 310 CMR 22.05(2)(a) through 310 CMR 22.05(2)(d), and all repeat samples were total coliform-negative.

(f) After a system collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliform, then the system may count the subsequent sample(s) as a repeat sample instead of as a routine sample.

(g) Results of all routine and repeat samples not invalidated by the Department must be included in determining compliance with the MCL for total coliform in 310 CMR 22.05(8).

(3) Invalidation of Total Coliform Samples. A total coliform-positive sample invalidated under 310 CMR 22.05(3) does not count towards meeting the minimum monitoring requirements of 310 CMR 22.05(3).

(a) The Department may invalidate a total coliform-positive sample only if the conditions of 310 CMR 22.05(3)(a)1., 310 CMR 22.05(3)(a)2., or 310 CMR 22.05(3)(a)3. are met.

1. The laboratory establishes that improper sample analysis caused the total coliform-positive result.

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2. The Department, on the basis of the results of repeat samples collected as required by 310 CMR 22.05(2)(a) through 310 CMR 22.05(2)(d), determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The Department cannot invalidate a sample on the basis of repeat sample results unless all repeat sample(s) collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected within five service connections of the original tap are total coliform-negative (e.g. the Department will not invalidate a total coliform-positive sample on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the public water system has only one service connection).

3. The Department has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required under 310 CMR 22.05(2)(a) through 310 CMR 22.05(2)(d), and use them to determine compliance with the MCL for total coliform in 310 CMR 22.05(8). To invalidate a total coliform-positive sample under 310 CMR 22.05(3)(a)3., the decision with the rationale for the decision must be documented in writing, and approved and signed by the supervisor of the Department official who recommended the decision. The Department must make this document available to EPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take to correct this problem. The Department may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.

(b) A laboratory must invalidate a total coliform sample (unless total coliform are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g., the Multiple-Tube Fermentation Technique), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P-A) Coliform Test, or exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (e.g., Membrane Filter Technique). If a laboratory invalidates a sample because of such interference, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliform. The system must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The Department may waive the 24-hour time limit on a case-by-case basis.

(4) Reserved

(5) Fecal Coliform/*Escherichia coli (E.coli)*

(a) If any routine or repeat sample is total coliform-positive, the system must analyze that total coliform-positive culture medium to determine if fecal coliform are present, except that the system may test for *E. coli* in lieu of fecal coliform. If fecal coliform or *E. coli* are present, the system must notify the Department by the end of the day that the system is notified of the test result, unless the system is notified of the result after the Department is closed, in which case the system must notify the Department before the end of the next business day.

(b) The Department has the discretion to allow a public water system, on a case-by-case basis, to forgo fecal coliform or *E. coli* testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is fecal coliform or *E. coli*-positive. Accordingly, the system must notify the Department as specified in 310 CMR 22.05(5)(a) and the provisions of 310 CMR 22.05(8)(b) shall apply.

(6) Analytical Methodology.

(a) The standard sample volume required for total coliform analysis, regardless of analytical method used, is 100 ml. Sample should be tested within two hours of receipt in the laboratory. However, the time from sample collection to initiation of analysis shall not exceed 30 hours. Samples should be kept at 10°C during transport or shipping to the laboratory.

(b) Public water systems need only determine the presence or absence of total coliform; a determination of total coliform density is not required.

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(c) Public water systems must conduct total coliform analyses in accordance with one of the following analytical methods set forth in 310 CMR 22.05(6)(c)1. through 310 CMR 22.05(6)(c)7. These methods are contained in the 18th edition (1992), 19th edition (1995) or 20th edition (1998) of Standard Methods for the Examination of Water And Wastewater, 1992, American Public Health Association, 1015 Fifteenth Street NW., Washington, DC 20005. The cited methods in any of these editions may be used.

1. Total Coliform Fermentation Technique (9221A, B). Lactose broth, as commercially available, may be used in lieu of laurel tryptose broth, if the system conducts at least 25 parallel tests between this medium and laurel tryptose broth using the water normally tested, and this comparison demonstrates that the false-positive rate for total coliform, using lactose broth, is less than 10%. If inverted tubes are used to detect gas production, the media should cover these tubes at least ½ to ⅔ after the same is added. No requirement exists to run the complete phase on 10% of all total coliform-positive confirmed tubes.
2. Total Coliform Membrane Filter (MF) Technique (9222 A, B, C).
3. Presence-Absence (P-A) Coliform Test. No requirement exists to run the completed phase on 10% of all total coliform-positive confirmed tubes. Six-times formulation strength may be used if the medium is filter-sterilized rather than autoclaved.
4. ONPG-MUG Test (9223). The ONPG-MUG Test is also known as the Autoanalysis Colilert System.
5. Colisure Test. The Colisure Test must be incubated for 28 hours before examining the results. If an examination of the results at 28 hours is not convenient, then results may be examined at any time between 28 hours and 48 hours. A description of the Colisure Test 8th edition February 28, 1999 may be obtained from IDEXX Laboratories Inc., One IDEXX Drive, Westbrook, Maine 04092. The Colisure Test may be read after an incubation time of 24 hours.
6. E*Colite Test. A description of the E*Colite Test "Presence/absence for Coliforms and E-coli in Water." December 21, 1997, is available from Charm Science Inc. 36 Franklin Street, Malden, MA 02148.
7. M-ColiBlue 24 Test. A description of the m-ColiBlue 24 test, August 17, 1999, is available from the Hach Company 100 Dayton Avenue, Ames, IA 50010.

(d) In *lieu* of the 10-tube MTF Technique specified in 310 CMR 22.05(6)(c)1., a public water system may use the MTF Technique using either five tubes (20-ml sample portions) or a single culture bottle containing the culture medium for the MTF Technique i.e., laurel tryptose broth (formulated as described in *Standard Methods for the Examination of Water and Wastewater*, 1985, American Public Health Association et al., 16th Edition, Method 908A - pp. 872), as long as a 100-ml water sample is used in the analysis.

(e) Each supplier of water must conduct fecal coliform analysis in accordance with the following procedure. When the MTF Technique or Presence-Absence (P-A) Coliform Test is used to test for total coliform, shake the lactose-positive presumptive tube or P-A bottle vigorously and transfer the growth with a sterile 3-mm loop or sterile applicator stick into brilliant green lactose bile broth and EC medium to determine the presence of total and fecal coliform, respectively. For EPA-approved analytical methods which use a membrane filter, transfer the total coliform-positive culture by one of the following methods: remove the membrane containing the total coliform colonies from the substrate with a sterile forceps and carefully curl and insert the membrane into a tube of EC medium. (the laboratory may first remove a small portion of selected colonies for verification), swab the entire membrane filter surface with a sterile cotton swab and transfer the inoculum to EC medium (do not leave the cotton swab in the EC medium), or inoculate individual total coliform-positive colonies into EC Medium. Gently shake the inoculated EC tubes to insure adequate mixing and incubate in a water bath at 44.5 ± 0.2°C for 24 ± 2 hours. Gas production of any amount in the inner fermentation tube of the EC medium indicates a positive fecal coliform test. The preparation of EC medium is described in Method 9221E (paragraph 1a) in *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), and 20th edition (1998); the cited method in any of these editions may be used. Public Water systems need only determine the presence or absence of fecal coliform; a determination of fecal coliform density is not required.

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(f) Copies of the analytical methods cited in *Standard Methods for the Examination of Water and Wastewater* may be obtained from the American Public Health Association; 1015 Fifteenth Street, NW.; Washington, DC 20005. Copies of the methods set forth in *Microbiological Methods for Monitoring the Environment, Water and Wastes* may be obtained from ORD Publications, U.S. EPA, 26 W. Martin Luther King Drive, Cincinnati, Ohio 45268. Copies of the MMO-MUG Test as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliform and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg et al.) may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, CO 80235.

1. EC medium supplemented with 50 µg/mL of 4-methylumbelliferyl-beta-Dglucuronide (MUG) (final concentration), as described in Method 9222G in *Standard Methods for the Examination of Water and Wastewater*, 19th edition (1995) and 20th edition (1998). Either edition may be used. Alternatively, the 18th edition (1992) may be used if at least 10 mL of EC medium, as described in 310 CMR 22.05(6)(e), is supplemented with 50 µg/mL of MUG before autoclaving. The inner inverted fermentation tube may be omitted. If the 18th edition is used, apply the procedure in 310 CMR 22.05(6)(e) for transferring a total coliform-positive culture to EC medium supplemented with MUG, incubate the tube at 44.5°C ± 0.2°C for 24 ± hours, and then observe fluorescence with an ultraviolet light (366 nm) in the dark. If fluorescence is visible, E. coli are present.
2. Nutrient agar supplemented with 100 µg/mL of 4-methylumbelliferyl-beta-Dglucuronide (MUG) (final concentration), as described in Method 9222G in *Standard Methods for the Examination of Water and Wastewater*, 19th edition (1995) and 20th edition (1998). Either edition may be used. Alternatively, the 18th edition (1992) may be used if the membrane filter containing a total coliform-positive colony(ies)is transferred to nutrient agar, as described in Method 9221B (paragraph 3) of Standard Methods (18th edition), supplemented with 100 µg/mL of MUG. If the 18th edition is used, incubate the agar plate at 35°C for four hours and then observe the colony(ies) under ultraviolet light (366 nm) in the dark for fluorescence. If fluorescence is visible, E. coli are present.

(7) Response to Violation.

(a) A public water system which has exceeded the MCL for total coliform in 310 CMR 22.05(8) must report the violation to the Department no later than the end of the next business day after it learns of the violation, and notify the public in accordance with 310 CMR 22.16.

(b) A public water system which has failed to comply with a coliform monitoring requirement, including the sanitary survey requirement, must report the monitoring violation to the Department within ten days after the system discovers the violation, and notify the public in accordance with 310 CMR 22.16.

(8) Maximum Contaminant Levels (MCLs) for Microbiological Contaminants.

(a) The MCL is based on the presence or absence of total coliform in routine samples, rather than coliform density.

1. For a system which collects at least 40 routine samples per month, if no more than 5.0% of the samples collected during a month are total coliform-positive, the system is in compliance with the MCL of total coliform.
2. For a system which collects fewer than 40 routine samples/month, if no more than one sample collected during a month is total coliform-positive, the system is in compliance with the MCL for total coliform.

(b) Any fecal coliform-positive repeat sample or *E. coli*-positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or *E. coli*-positive routine sample constitutes a violation of the MCL for total coliform. For purposes of the public notification requirements in 310 CMR 22.16, this is a violation that may pose an acute risk to health.

(c) A public water system must determine compliance with the MCL for total coliforms in 310 CMR 22.05(8)(a) and 310 CMR 22.05(8)(b) for each month in which it is required to monitor for total coliform.

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(9) Best Available Technology, Treatment Techniques. The following have been determined to provide best available technology, treatment techniques or other means available for achieving compliance with the maximum contaminant level for total coliform in 310 CMR 22.05(8)(a) and 310 CMR 22.05(8)(b):

1. Protection of wells from contamination by coliforms by appropriate placement and construction;
2. Maintenance of a disinfectant residual throughout the distribution system;
3. Proper maintenance of the distribution system including appropriate pipe replacement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, and continual maintenance of positive water pressure in all parts of the distribution system;
4. Filtration and/or disinfection of surface water, as described in 310 CMR 22.20A or disinfection of ground water using strong oxidants such as chlorine, chlorine dioxide, or ozone; or
5. The development and implementation of a Department approved wellhead protection program under 310 CMR 22.21.

(10) Variances From The Total Coliform MCL: A public water system may be issued a variance by the Department to the total coliform MCL (310 CMR22.05(8) provided that said system can demonstrate that no unreasonable risk to health exists using the following criteria:

(a) Over the past 30 days, water entering the distribution system at the point-of-entry is shown to:

1. Be free from *E. Coli* or fecal coliform occurrence based on at least daily sampling,
2. Contain less than one total coliform per hundred milliliters of influent water in at least 95% of all samples based on at least daily sampling,

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3. Comply with the total turbidity requirements of 310 CMR 22.08, except that surface waters presently filtering should comply with 310 CMR 22.20A(4), and

4. Contain a continuous disinfection residual of at least 0.2 mg/l;

(b) The system has had no waterborne disease outbreak while operated in its present configuration;

(c) The system maintains biweekly contact with the Drinking Water Program and the local board of health to assess illness possibly attributed to microbial occurrence in the public drinking water system;

(d) The system has evaluated, on a monthly basis, at least the number of samples specified in 310 CMR 22.05(1)(b) and has not had an *E. Coli*-positive compliance sample within the last six months, unless the system demonstrates to the Department that the occurrence is not due to contamination entering the distribution system;

(e) The system has undergone a sanitary survey conducted by the Department within the past 12 months;

(f) The system has a cross connection control program acceptable to the Department and performs an audit of the effectiveness of the program;

(g) The system agrees to submit a biofilm control plan to the Department within 12 months of the first request for a variance;

(h) The system monitors general distribution system bacterial quality by conducting heterotrophic bacteria plate counts on at least a weekly basis at a minimum of 10% of the number of total coliform sites specified for that system size in 310 CMR 22.05(1)(b) (preferably using R_2A medium and the procedure outlined in the 18th edition of *Standard Methods for the Examination of Water and Wastewater*, 1992, American Public Health Association, *et.al.*); and

(i) The system conducts daily monitoring at distribution system sites approved by the Department and maintains a detectable disinfectant residual (measured as specified in 310 CMR 22.20A(5)(a)5.) at a minimum of 95% of those points and a heterotrophic plate count of less than 500 colonies per ml (measured as specified in 310 CMR 22.20A(5)(a)3.) at sites without a disinfectant residual.

22.06: Inorganic Chemical Maximum Contaminant Levels, Monitoring Requirements and Analytical Methods

(1) Monitoring: A supplier of water shall collect samples of water as specified in 310 CMR 22.06(4) and provide for analysis of such samples for inorganic chemical contaminants listed in 310 CMR 22.06(2) consistent with the requirements set forth in 310 CMR 22.06(5) through (8) and methods set forth in 310 CMR 22.06(15).

All analytical results shall be rounded to the same number of significant figures as the applicable MCL or SMCL.

(2) Inorganic Maximum Contaminant Levels (MCLs): The maximum contaminant levels for inorganic contaminants specified in 310 CMR 22.06(2)(b) through (g) and (k) through (p) apply to community water systems and non-transient non-community water systems. The maximum contaminant level specified in 310 CMR 22.06(2)(a) only applies to community water systems. The Maximum Contaminant Levels specified in 310 CMR 22.06(2)(h),(i) and (j) apply to community, non-transient non-community, and transient non-community water systems. The Maximum Contaminant Level for arsenic is 0.05 milligrams per liter for community water systems and non-transient non-community water systems until January 23, 2006.

MAXIMUM CONTAMINANT LEVELS FOR INORGANIC CHEMICALS

Contaminant	MCL (mg/l)
(a) Fluoride (C)	4.0
(b) Asbestos (C, NTNC)	7 Million Fibers/liter (longer than 10 μm)
(c) Arsenic (C,NTNC)	0.010
(d) Barium (C,NTNC)	2
(e) Cadmium (C,NTNC)	0.005
(f) Chromium (C,NTNC)	0.1
(g) Mercury (C,NTNC)	0.002
(h) Nitrate (C,NTNC,TNC)	10 (as Nitrogen)
(i) Nitrite (C,NTNC,TNC)	1 (as Nitrogen)
(j) Total Nitrate & Nitrite (C,NTNC,TNC)	10 (as Nitrogen)

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(k) Selenium (C,NTNC)	0.05
(l) Antimony (C,NTNC)	0.006
(m) Beryllium (C,NTNC)	0.004
(n) Cyanide (C,NTNC)	0.2
(n) Nickel (C,NTNC)	Reserved (Under review)
(p) Thallium (C,NTNC)	0.002

C = Community Systems; NTNC = Non-transient non-community systems; TNC = Transient non-community

(3) Inorganic Chemicals (IOC): Sampling and Analytical Requirements: Community water systems and non-transient non-community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in 310 CMR 22.06(2) in accordance with 310 CMR 22.06. Transient, non-community water systems shall conduct monitoring to determine compliance with the MCL's for nitrate, nitrite and total nitrate in 310 CMR 22.06(2)(h), (i), (j) (as appropriate) in accordance with 310 CMR 22.06.

(4) Sampling Protocol: Monitoring shall be as follows:

(a) Ground Water Sampling Points: Groundwater systems shall take one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point) beginning in the compliance period starting January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(b) Surface Water Sampling Points: Surface water systems (Note: For purposes of 310 CMR 22.06(4)(b), surface water systems include systems with a combination of surface and ground sources.) shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point) beginning in the compliance period beginning January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(c) Multiple Sources: If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

(d) Composite Sampling: The total number of samples which must be analyzed may be reduced by compositing samples. Composite samples from a maximum of five sampling points are allowed provided that the detection limit of the method used for analysis is less than one-fifth of the MCL and none of the samples to be composited are representative of multiple sources. Compositing of samples must be approved by the Department and must be done in the laboratory. Compositing of source with previous detects is not allowed, unless otherwise authorized by the Department

1. If the concentration in the composite sample is greater than or equal to one-fifth of the MCL of any inorganic chemical, then a follow-up sample must be analyzed within 14 days from each sampling point included in the composite. These samples must be analyzed for the contaminants that exceeded one-fifth of the MCL in the composite sample. Detection limits for each analytical method and MCL are the following:

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DETECTION LIMITS FOR INORGANIC CONTAMINANTS

Contaminant	MCL(mg/l)	Methodology	Detection Limit (mg/l)
Antimony	0.006	Atomic Absorption; furnace	0.003
			0.0008[5]
		ICP-Mass Spectrometry	0.0004
		Hydride-Atomic absorption	0.001
Arsenic	0.010[6]	Atomic Absorption; Furnace	0.001
		Atomic Absorption; Platform-Stabilized Temperature	0.0005[7]
		Atomic Absorption; Gaseous Hydride	0.001
		ICP- Mass Spectrometry	0.0014[8]
Asbestos	7 MFL[2]	Transmission Electron Microscopy	0.2 MFL
Barium	2	Atomic Absorption; furnace technique	0.002
		Atomic Absorption; direct aspiration	0.1
		Inductively Coupled Plasma	0.002
			(0.001)
Beryllium	0.004	Atomic Absorption; furnace	0.0002
		Atomic Absorption; platform	0.00002[5]
		Inductively Coupled Plasma[3]	0.0003
		ICP-Mass Spectrometry	0.0003
Cadmium	0.005	Atomic Absorption; furnace technique	0.0001
		Inductively Coupled Plasma[1]	0.001
Chromium	0.1	Atomic Absorption; furnace technique	0.001
		Inductively Coupled Plasma	0.007
			(0.001)[1]
Cyanide	0.2	Distillation, Spectrophotometric [3]	
		Distillation, Automated, Spectrophotometric[3]	0.005
		Distillation, Selective Electrode [3]	0.02
		Distillation, Amenable, Spectrophotometirc [4]	0.0002
Mercury	0.002	Manual Cold Vapor Technique	0.0002
		Automated Cold Vapor Technique	0.0002
Nickel	Reserved		
Nitrate	10 (as N)	Manual Cadmium Reduction	0.01
		Automated Hydrazine Reduction	0.01
		Automated Cadmium Reduction	0.05
		Ion Selective Electrode	1
		Ion Chromatography	0.01
Nitrite	1 (as N)	Spectrophotometric	0.01
		Automated Cadmium Reduction	0.05
		Manual Cadmium Reduction	0.01
		Ion Chromatography	0.004
Selenium	0.05	Atomic Absorption; furnace	0.002
		Atomic Absorption: gaseous hydride	0.002
Sodium		See 310 CMR 22.06A	
Thallium	0.002	Atomic Absorption; furnace	0.001
		Atomic Absorption; platform	0.0007[5]
		ICP-Mass Spectrometry	0.0003

[1] MFL = million fibers per liter >10 μm.

[2] Using a 2X preconcentration step as noted in Method 200.7. Lower MDLs may be achieved when using a 4X preconcentration.

[3] Screening methods for total cyanides.

[4] Measures "free" cyanides.

[5] Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.

[6] The MCL for arsenic is effective January 23, 2006. Until then, the MCL is 0.05 mg/l.

[7] The MDL reported for EPA method 200.9 (Atomic Absorption; Platform---Stabilized Temperature) was determined using a 2x concentration step during sample digestion. The MDL determined for samples analyzed using direct analyses (i.e., no sample digestion) will be higher. Using multiple deposition, EPA 200.9 is capable of obtaining MDL of 0.0001 mg/l.

[8] Using selective ion monitoring, EPA Method 200.8 (ICP-MS) is capable of obtaining a MDL of 0.0001 mg/l.

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2. If the population served by the system is >3,300 persons, then compositing may only be permitted at sampling points within a single system. In systems serving ≤3,300 persons, compositing among different systems may be allowed with the approval of the Department, provided the five-sample limit is maintained.

3. If duplicates of the original sample taken form each sampling point used in the composite are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the Department within 14 days after completion of the composite analyses or before the holding time for the control sample is exceeded, whichever is sooner.

(e) Frequency Requirements for IOC Monitoring: The frequency of monitoring for asbestos shall be in accordance with 310 CMR 22.06(5); the frequency of monitoring for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be in accordance with 310 CMR 22.06(6); the frequency of monitoring for nitrate shall be in accordance with 310 CMR 22.06(7); and the frequency of monitoring for nitrite shall be in accordance with 310 CMR 22.06(8).

(f) Consecutive System Monitoring: Public water systems that obtain water from another public water system are exempt from conducting compliance monitoring for the purchased portion of the system for the inorganic chemicals under 310 CMR 22.06, provided that the system from which the water is obtained has conducted the analyses required under 310 CMR 22.06, unless otherwise specified by the Department. These systems are not exempt from 310 CMR 22.06(5) asbestos sampling.

(5) Asbestos Sampling Frequency: The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in 310 CMR 22.06(2) shall be conducted as follows:

(a) Initial Sampling Frequency: Each community and non-transient, non-community water system is required to monitor for asbestos during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993 as specified in 310 CMR 22.06(5)(e), (f) and (g).

(b) Sampling During Waiver: If the system believes it is not vulnerable to either asbestos contamination in its source water or due to corrosion of asbestos-cement pipe, or both, it may apply to the Department for a waiver of the monitoring requirement in 310 CMR 22.06(5)(a). If the Department grants the waiver, the system will be required to monitor pursuant to 310 CMR 22.06(5)(d).

(c) Basis of an Asbestos Waiver: The granting of a waiver will be based on a consideration of the following factors:

1. Potential asbestos contamination of the water source, and

2. The use of asbestos-cement pipe for finished water distribution and the corrosive nature of the water.

(d) Effect of an Asbestos Waiver: A waiver remains in effect until the completion of the three-year compliance period. Systems not receiving a waiver must monitor in accordance with the provisions of 310 CMR 22.06(5)(a).

(e) Distribution System Sampling Criteria for Asbestos: A system vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe shall take at a minimum one sample at a tap approved by the Department. This tap location must be served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur. Additional sample locations (taps) may be required if in the Department's opinion the use of asbestos-cement is extensive and contamination is likely to occur in several areas of the system.

(f) Source Water Sampling Criteria for Asbestos: A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provision of 310 CMR 22.06(2) and 22.06(4)

(g) Combined Asbestos Vulnerability: A system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe shall monitor is in accordance with 310 CMR 22.06(5)(e) and (f).

(h) Exceeding the Asbestos MCL: A system which exceeds the maximum contaminant levels as defined by 310 CMR 22.06(2) shall report to the Department within seven days and shall monitor quarterly beginning in the following quarter.

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(i) Average Exceeding MCL: When the average of four analyses made pursuant to 310 CMR 22.06(5)(h), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 310 CMR 22.15 and give public notice to the public pursuant to 310 CMR 22.16. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as condition to variance, exemption or enforcement action shall become effective.

(j) Asbestos Reliably & Consistently Below the MCL: The quarterly monitoring requirement may be decreased to the frequency specified in 310 CMR 22.06(5)(a) provided the Department has determined that the system is reliably and consistently below the maximum contaminant level and a groundwater system has taken a minimum of two quarterly samples and a surface (or combined surface/ground) water system has taken a minimum of four quarterly samples.

(k) Grandfathered Asbestos Data: If monitoring data collected after January 1, 1990 are generally consistent with the requirements of 310 CMR 22.06(5), the data may be used with the Department's approval, to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

(6) Sampling Frequency for IOCs: The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in 310 CMR 22.06(2) for antimony, arsenic, beryllium, barium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be as follows:

(a) IOCs Sampling Frequency: Groundwater systems shall take one sample at each sampling point once every three years. Surface water systems (or combined surface/ground) shall take one sample annually at each sampling point.

(b) IOCs Sampling Waiver: The system may apply to the Department for a waiver from the monitoring frequencies specified in 310 CMR 22.06(6)(a).

(c) IOC Sampling During a Waiver: A condition of the waiver shall require that a system shall take a minimum of one sample while the waiver is effective. The term during which the waiver is effective shall not exceed one compliance cycle (i.e., nine years).

(d) Basis of an IOC Waiver & Grandfathered Data: A waiver may be granted by the Department provided the surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (Analytical monitoring results must have been representative of all sources at the time of sampling.) Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the maximum contaminant level. Systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the new source have been completed.

(e) Basis of the IOC Sampling Frequency During a Waiver: The granting of a waiver by the Department will be based on the following:

1. Reported concentrations from all previous monitoring;
2. The degree of variation in reported concentrations; and
3. Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the system's configuration, changes in the system's operating procedures, or changes in stream flows or characteristics.

(f) Effect of an IOC Waiver: A supplier of water must have received a written approval from the Department which shall set forth the basis for the determination. The determination may be initiated by the Department or upon an application by the public water system. The public water system shall specify the basis for its request. The Department may revise its determination of the appropriate monitoring frequency, if the system submits new monitoring data or when other data relevant to the system's appropriate monitoring frequency become available.

(g) Exceeding an IOC MCL: Systems which exceed a maximum contaminant levels as defined by 310 CMR 22.06(2) shall report to the Department within seven days and shall monitor quarterly beginning in the following quarter.

22.06: continued

(h) Average Exceeding MCL: When the average of four analyses made pursuant to 310 CMR 22.06(6)(g), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 310 CMR 22.15 and give public notice to the public pursuant to 310 CMR 22.16. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as condition to variance, exemption or enforcement action shall become effective.

(i) IOCs Reliably & Consistently Below the MCL: If the system is reliably and consistently below the maximum contaminant level, the quarterly monitoring requirement may be decreased with the Department's approval to the frequencies specified in 310 CMR 22.06(6)(a). Systems requesting this decrease must have taken at a minimum two quarterly samples for a groundwater system and four quarterly samples for a surface water system.

(j) All new public water systems or systems that use a new source of water that begin operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time as specified by the Department. The system must also comply with the initial sampling frequencies specified by the Department to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in 310 CMR 22.06(6).

(7) Sampling Frequency for Nitrate: All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrate specified in 310 CMR 22.06(2).

(a) Initial Nitrate Sampling: Community and non-transient, non-community water systems served by groundwater source shall monitor annually beginning January 1, 1993; systems served by surface water shall monitor quarterly beginning January 1, 1993.

(b) Transient Non-Community Nitrate Sampling Frequency: Each transient non- community water system shall monitor annually beginning January 1, 1993.

(c) Ground Water Repeat Nitrate Sampling Frequency: For all public water systems: the repeat monitoring frequency for ground water systems shall be quarterly for at least one year following any one sample in which the concentration is ≥ 50% the MCL. A groundwater system may reduce the sampling frequency to annually with the Department's approval, after four consecutive quarterly samples are reliably and consistently less than the MCL.

(d) Surface Water Repeat Nitrate Sampling Frequency: All public water systems with surface water sources may reduce the sampling frequency to annually with the Department's approval, if all analytical results from four consecutive quarters are <50% of the MCL. A surface water system shall return to quarterly monitoring if any one sample is ≥ 50% of the MCL.

(e) Scheduling Annual Nitrate Repeat Samples: After the initial round of quarterly sampling is completed, all public water systems which are monitoring quarterly because the concentration of any one sample was>50% of the MCL shall take subsequent annual samples during the quarter(s) which previously resulted in the highest analytical result.

(8) Sampling Frequency for Nitrite: All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrite in 310 CMR 22.06(2).

(a) Initial Nitrite Sampling: All public water systems shall take one sample at each sampling point in the compliance period beginning January 1, 1993 and ending December 31, 1995.

(b) Under the Nitrite Trigger Level: After the initial sample, systems where an analytical result for nitrite is <50% of the MCL shall monitor at the frequency specified by the Department.

(c) Above the Nitrite Trigger Level: For community, non-transient, non-community, and transient non-community water systems, the repeat monitoring frequency for any water system shall be quarterly for at least one year following any one sample in which the concentration is ≥ 50% of the MCL. With the Department's approval, a system may reduce the sampling frequency to annually if the system is reliably and consistently less than the MCL.

22.06: continued

(d) Scheduling of Annual Nitrite Repeat Samples: Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.

(9) Confirmation Sampling:

(a) Deadline for IOCs Confirmation Samples: Where the results of sampling for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, or thallium indicate an exceedance of the maximum contaminant level, one additional sample shall be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point.

(b) Deadline for Nitrate & Nitrite Confirmation Samples: Where nitrate or nitrite sampling results indicate an exceedance of the maximum contaminant level, the system shall take a confirmation sample within 24 hours of the system's receipt of notification of the analytical results of the first sample and shall report to the Department within seven days. Systems unable to comply with the 24-hour sampling requirement must immediately notify the consumers served by the area served by the public water system in accordance with 310 CMR 22.16. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

(c) Compliance Calculations & Confirmation Samples: The results of the initial and confirmation sample shall be averaged. The resulting average shall be used to determine the system's compliance in accordance with 310 CMR 22.06(12). Obvious sampling errors may be deleted with the approval of the Department.

(10) Increased Sampling Frequency: The Department may require more frequent monitoring than specified in 310 CMR 22.06(5) through (8) or may require confirmation samples for positive and negative results at its discretion.

(11) PWS Request for Increased Sampling Frequency: Systems may apply to the Department to conduct more frequent monitoring than the minimum monitoring frequencies specified in 310 CMR 22.06.

(12) Compliance Calculations: Compliance with the maximum contaminant levels set out in 310 CMR 22.06(2) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.

(a) Sampling Frequencies Greater than Annual: For systems monitoring more than once per year, compliance with the MCL, with the exception of nitrate and nitrite, is determined by a running annual average at each sampling point.

(b) Sampling Frequencies of Annual or Less: Each supplier of water monitoring annually or less frequently whose sample result exceeds an MCL, with the exception of nitrate and nitrite, must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.

(c) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.

(d) If a supplier of water fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.

(e) If a sample result is less than the detection limit, zero will be used to calculate the annual average.

(f) Compliance Calculations for Nitrate & Nitrite: Compliance with the maximum contaminant levels for nitrate and nitrite is determined based on one sample if the levels of these contaminants is below the MCLs. If the levels of nitrate or nitrite exceed the MCLs in the initial sample, a confirmation sample is required in accordance with 310 CMR 22.06(9)(b) and (c), and compliance shall be determined based on the average of the initial and confirmation samples.

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(g) Average Exceeding IOC MCL: When the average of four analyses made pursuant to 310 CMR 22.06(5)(h) or 310 CMR 22.06(6)(g), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 310 CMR 22.15 and give public notice pursuant to 310 CMR 22.16. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(h) Arsenic sampling results shall be reported to the nearest 0.001 mg/l.

(13) Sampling Schedules: Each public water system shall monitor at the time designated by the Department during each compliance period.

(14) Reporting MCL Violation: A system which exceeds the MCL listed in 310 CMR 22.06(2) and is out of compliance shall report the exceedance to the Department within seven days.

(15) Analytical and Sampling Methods for Inorganics:

(a) Analytical Methods for IOCs: Analysis for the listed inorganic contaminants shall be conducted using the following methods:

INORGANIC CONTAMINANTS ANALYTICAL METHODS

		Reference (Method Number)			
Contaminant	Methodology[13]	EPA	ASTM[3]	SM[4]	Other
Antimony	Atomic Absorption: Furnace			3113B	
	Atomic Absorption: platform	[2]200.9			
	ICP-Mass Spectrometry	[2]200.8			
	Hydride-Atomic Absorption		D-3697-92		
Arsenic[14]	Atomic Absorption: Furnace		D2972-97C	3113B	
	Atomic Absorption; Hydride		D-2972-97B	3114B	
	Inductively Coupled Plasma[15]	[2]200.7		3120B[15]	
	ICP-Mass Spectrometry	[2]200.8			
	Atomic Absorption; Platform	[2]200.9			
Asbestos	Transmission Electron Microscopy	[9]100.1	--	--	
	Transmission Electron Microscopy	[10]100.2			
Barium	Atomic Absorption; Furnace		--	3113B	--
	Atomic Absorption; Direct		--	3111D	--
	Inductively Coupled Plasma	[2]200.7	--	3120B	--
	ICP-Mass Spectrometry	[2]200.8			
Beryllium	Atomic Absorption; Furnace		D-3645-93B	3113B	
	Atomic Absorption; Platform	[2]200.9			
	Inductively Coupled Plasma	[2]200.7		3120B	
	ICP-Mass Spectrometry	[2]200.8			
Cadmium	Atomic absorption; Furnace		--	3113B	--
	Inductively-coupled Plasma	[2]200.7	--	--	--
	ICP-Mass Spectrometry	[2]200.8			
	Atomic Absorption; Platform	[2]200.9			
Chromium	Atomic absorption; Furnace		--	3113B	--
	Inductively Coupled Plasma	[2]200.7	--	3120B	--
	ICP-Mass Spectrometry	[2]200.8			
	Atomic Absorption; Platform	[2]200.9			

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INORGANIC CONTAMINANTS ANALYTICAL METHODS (continued)

		Reference (Method Number)			
Contaminant	Methodology[13]	EPA	ASTM[3]	SM[4]	Other
Cyanide	Manual Distillation		D2036-98A	4500-CN-C	
	Manual Distillation followed by: Spectrophotometric, Amenable		D2036-96B	4500-CN-G	
	Manual Distillation followed by: Spectrophotometric, Manual		D2036-98A	4500-CN-E	I-3300-85[5]
	Semi-automated	[6]335.4			
	Selective Electrode			4500-CN-F	
Mercury	Manual cold vapor	[2]245.1	D3223-97	3112B	--
	Automated cold vapor	[1]245.2	--	--	--
	ICP-Mass Spectrometry	[2]200.8			
Nickel	Atomic Absorption: Furnace			3113B	
	Atomic Absorption: Platform	[2]200.9			
	Atomic Absorption Direct			3111B	
	Inductively Coupled Plasma	[2]200.7		3120B	
	ICP-Mass Spectrometry	[2]200.8			
Nitrate	Manual cadmium reduction		D3867-90B	4500-NO_3-E	--
		--	--	--	
	Automated cadmium reduction	[6]353.2	D3867-90A	4500-NO_3-F	--
	Ion selective electrode	--	--	4500-NO_3-D	601[7]
	Ion chromatography	[6]300.0	D4327-97	4110B	B-1011[8]
Nitrite	Spectrophotometric		--	4500-NO_2-B	
	Automated cadmium reduction	[6]353.2	D3867-90A	4500-NO_3-F	--
	Manual cadmium reduction		D3867-90B	4500-NO_3-E	--
	Ion chromatography	[6]300.0	D4327-97	4110B	B-1011[8]
Selenium	Hydride-Atomic absorption;		D3859-98A	3114B	
	Atomic Absorption: Furnace		D3859-98B	3113B	
	ICP-Mass Spectrometry	[2]200.8			
	Atomic Absorption; Platform	[2]200.9			
Thallium	Atomic absorption; Platform	[2]200.9			
	ICP-Mass Spectrometry	[2]200.8			

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1-11 and 15 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 900-426-4791. Documents may be inspected at EPA's Drinking Water Docket, 401 M Street, SW., Washington, DC 20460 (Telephone 202-260-3027); or at the Office of Federal Register, 800 North Capital Street, NW., Suite 700, Washington, DC.

[1] - "Methods of Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983. Available at NTIS, PB84-128677.

[2] - "Methods for the Determination of Metals in Environmental Samples - Supplement I", EPA-600/R-94/111, May 1994. Available at NTIS, PB 95-125472.

[3] - Annual Book of ASTM Standards, 1994 , 1996, or 1999 Vols. 11.01 and 11.02, American Society for Testing and Materials. The previous versions of D1688-95A, D1688-95C (copper), D3559-95D (lead), D1293-95 (pH), D1125-95A, (conductivity) and D859-94 (silica) are also approved. These previous versions D1688-90A, C; D3559-90D, D1293-84, D1125-91A and D859-88, respectively are located in the Annual Book of ASTM Standards, 1994, Vols. 11.01. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

[4] – 18th, 19th, and 20th edition of "Standard Methods for the Examination of Water and Wastewater", 18th (1982), 19th (1995), and 20th (1998) editions, American Public Health Association; either edition may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005. The cited methods published in any of these three editions may be used, except that the versions of 3111B, 3111D, 3113B and 3114B in the 20th edition may not be used.

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[5] - Method I-2601-90, "Methods for Analysis by the U.S. Geological Survey National Water Quality Laboratory – Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments", Open File Report 93-125, 1993; For Methods I-1030-85; I-1601-85; I-1700-85; I-2598-85, I-2700-85; and I-3300-85 See "Techniques of Water Resources Investigation of the U.S. Geological Survey", Book 5, Chapter A-1, 3rd edition, 1989; Available from Information Services, U.S. Geological Survey, Federal Center, Box 25286, Denver, CO 80225-0425.
[6] - "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA 600/R-93/100, August 1993. Available at NTIS, PB94-120821.
[7] – The procedure shall be done in accordance with Technical Bulletin 601 "Standard Method of Test for Nitrate in Drinking Water", July 1994, PN 221890-001, Analytical Technology, Inc. Copies may be obtained from ATI Orion, 529 Main Street, Boston, MA 02129.
[8] – Method B-1011, "Standard Method of Test for Nitrate in Drinking Water", July 1994, PN 221890-001, Analytical Technology, Inc. Copies may be obtained from ATI Orion, 529 Main Street, Boston, MA 02129.
[9] – Method 100.1, "Analytical Methods for Determination of Asbestos Fibers in Water", EPA/600/4-83/043, September 1983, Available at NTIS, PB83-206471.
[10] – 10 Method 100.2, "Determination of Asbestos Structures Over 10 μm in Length in Drinking Water," EPA/600/R-94/134, June 1994. Available at NTIS, PB94-201902.
[11] – Industrial Method No. 129-71W, "Fluoride in Water and Wastewater", December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater", February 1976, Technicon Industrial Systems. Copies may be obtained from Bran & Luebbe, 1025 Busch Parkway, Buffalo Grove, IL 60089.
[12] – Unfiltered, no digestion or hydrolosis.
[13] – Because MDLs reported in EPA Methods 200.7 and 200.9 were determined using a 2X preconcentration step during sample digestion, MDLs determined when samples are analyzed by direct analysis (i.e. no sample digestion) will be higher. For direct analysis of cadmium and arsenic by Method 200.7, and arsenic by Method 3120B sample preconcentration using pneumatic nebulization may be required to achieve lower detection limits. Preconcentration may also be required for direct analysis of antimony, lead, and thallium by Method 200.9; antimony and lead by Method 3113B; and lead by Method D3559-90D unless multiple in-furnace depositions are made.
[14] – If ultrasonic nebulization is used in the determination of arsenic by Methods 200.7, 200.8, or SM 3120 B, the arsenic must be in the pentavalent state to provide uniform signal response. For methods 200.7 and 3120B, both samples and standards must be diluted in the same mixed acid matrix concentration of nitric and hydrochloric acid with the addition of 100 μL of 30% hydrogen peroxide per 100 ml of sodium hypochlorite. For direct analysis of arsenic with the Method 200.8 using ultrasonic nebulization, samples must contain 1 mg/L of sodium hypochlorite.
[15] – After January 23, 2006 analytical methods using the ICP-AES technology, may not be used because the detection limits for these methods are 0.008 mg/L or higher. This restriction means that the two ICP-AES methods (EPA Method 200.7 and SM 3120 B) approved for use for the MCL of 0.05 mg/L may not be used for compliance determinations for the revised MCL of 0.01 mg/L. However, prior to 2005 systems may have compliance samples analyzed with these less sensitive methods.

(b) Analytical Methods for Fluoride: Analyses for fluoride shall be conducted using the following methods:

	Reference (Method Number)			
Methodology	EPA	ASTM[1]	SM[2]	Other
Ion Chromatography	300.0[5]	D4327-97	4110B	--
Manual Distillation; Colorimetric SPADNS			4500F-B,D	--
Manual Electrode		D1179-93B	4500F-C	
Automated Alizarin fluorine blue - lanthanum, with distillation (complexone)			4500F-E	129-71W[3]
Automated ion selective electrode	--	--	--	380-75WE[4]

1 - Annual Book of ASTM Standards, part 31 Water. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.
2 - "Standard Methods for the Examination of Water and Wastewater," 18th, 19th, and 20th edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1992, 1995, and 1998.
3 - "Fluoride in Water and Wastewater, Industrial Method # 129-71W." Technicon Industrial Systems, Tarrytown, New York, 10591. December 1972.
4 - "Fluoride in Water and Wastewater," Technicon Industrial Systems, Tarrytown, New York, 10591. February 1976.
5 - "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93/100, August 1993. Available at NTIS, PB94-120821.

22.06: continued

(c) Sample Collection Methods for IOCs: Sample collection for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium and thallium under 310 CMR 22.06 shall be conducted using the sample preservation, container, and maximum holding time procedures specified in the table below:

Contaminant	Preservative[1]	Container[2]	Time[3]
Antimony	Con HNO_3 to pH<2	P or G	six months
Arsenic	Con HNO_3 to pH<2	P or G	six months
Asbestos	Cool, 4°C	P or G	48 hours
Barium	Con HNO_3 to pH<2	P or G	six months
Beryllium	Con HNO_3 to pH<2	P or G	six months
Cadmium	Con HNO_3 to pH<2	P or G	six months
Chromium	Con HNO_3 to pH<2	P or G	six months
Cyanide	Cool,4°C,NAOH to pH>12[4]	P or G	14 days
Fluoride	None	P or G	one month
Mercury	Con HNO_3 to pH<2	P or G	28 days
Nickel	Conc HNO_3	P or G	six months
Nitrate			
Chlorinated	Cool, 4°C	P or G	14 days
Chlorinated	Con H_2SO_4 to pH<2	P or G	28 days
Non-chlorinated	Cool 4°C	P or G	48 days
Non-chlorinated	Con H_2SO_4 to pH<2	P or G	28 days
Nitrite	Cool, 4°C	P or G	48 hours
Selenium	Con HNO_3 to pH<2	P or G	six months
Thallium	Con HNO_3 to pH<2	P or G	six months

[1] - For cyanide determinations samples must be adjusted with sodium hydroxide to pH 12 at the time of collection. When chilling is indicated the sample must be shipped and stored at 4°C or less. Acidification of nitrate or metals samples may be with a concentrated acid or a dilute (50% by volume) solution of the applicable concentrated acid. Acidification of samples for metals analyses is encouraged and allowed at the laboratory rather than at the time of sampling provided the shipping time and other instruction in Section 8.3 of EPA methods 200.78 or 200.8 or 200.9 are followed.

[2] - P = plastic, hard or soft; G = glass, hard or soft.

[3] - In all cases, samples should be analyzed as soon after collection as possible. Follow additional (if any) information on preservation, containers, or holding times that is specified in the method.

[4] - See method(s) for the information for preservation.

(16) BATs for IOCs: The following are the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for inorganic contaminants identified in 310 CMR 22.06(2) except fluoride and arsenic:

BAT FOR INORGANIC CONTAMINANTS LISTED IN 310 CMR 22.06(2)

CHEMICAL NAME	BAT(s)
Antimony	2,7
Arsenic	1,2,5,6,7,9,12[5]
Asbestos	2,3,8
Barium	5,6,7,9
Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6[2],7
Cyanide	5,7,10
Mercury	2[1],4,6[1],7[1]
Nickel	5,6,7
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2[3],6,7,9
Thallium	1,5

Key to BATs in Table

1 = Activated Alumina

2 = Coagulation/Filtration (Not BAT for Systems <500 service connections)

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3 = Direct and Diatomite Filtration
4 = Granular Activated Carbon
5 = Ion Exchange
6 = Lime Softening (not BAT for systems <500 service connections)
7 = Reverse Osmosis
8 = Corrosion Control
9 = Electrodialysis
10 = Chlorine
11 = Ultraviolet
12 = Oxidation/Filtration

[1]BAT only if influent Hg concentrations ≤10 µg/l.
[2]BAT for Chromium III only
[3]BAT for Selenium IV only
[4]BAT for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.
[5]To obtain high removals; iron to arsenic ratio must be at least 20.1.

(17) The Administrator, pursuant to section 1412 of the Act, hereby identifies in the following table the affordable technology, treatment technique, or other means available to systems serving 10,000 persons or fewer for achieving compliance with the maximum contaminant level for arsenic:

SMALL SYSTEM COMPLIANCE TECHNOLOGIES (SSCTS) [1] FOR ARSENIC [2]

Small system compliance technology	Affordable for listed small system categories [3]
Activated Alumina (centralized)	All size categories.
Activated Alumina (Point-of-Use) [4]	All size categories.
Coagulation/Filtration [5]	501–3,300, 3,301–10,000.
Coagulation-assisted Microfiltration	501–3,300, 3,301–10,000.
Electrodialysis reversal [6]	501–3,300, 3,301–10,000.
Enhanced coagulation/filtration	All size categories
Enhanced lime softening (pH> 10.5)	All size categories.
Ion Exchange	All size categories.
Lime Softening [5]	501–3,300, 3,301–10,000.
Oxidation/Filtration [7]	All size categories.
Reverse Osmosis (centralized) [6]	501–3,300, 3,301–10,000.
Reverse Osmosis (Point-of-Use) [4]	All size categories.

[1] Section 1412(b)(4)(E)(ii) of SDWA specifies that SSCTs must be affordable and technically feasible for small systems.
[2] SSCTs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.
[3] The Act (ibid.) specifies three categories of small systems: (i) those serving 25 or more, but fewer than 501, (ii) those serving more than 500,
but fewer than 3,301, and (iii) those serving more than 3,300, but fewer than 10,001.
[4] When POU or POE devices are used for compliance, programs to ensure proper long-term operation, maintenance, and monitoring must be
provided by the water system to ensure adequate performance.
[5] Unlikely to be installed solely for arsenic removal. May require pH adjustment to optimal range if high removals are needed.
[6] Technologies reject a large volume of water—may not be appropriate for areas where water quantity may be an issue.
[7] To obtain high removals, iron to arsenic ratio must be at least 20:1.

22.06A: Special Monitoring for Sodium, Reporting and Analytical Methods and Frequency

(1) Monitoring: All public water systems (community, non-transient, non-community and transient non-community;) shall monitor for the determination of sodium concentration levels.

22.06A: continued

(2) Initial Sampling Frequency: Each community, non-transient, non-community and transient non-community water system is required to monitor for sodium during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993.

(a) GW Sampling Frequency: Groundwater systems shall take one sample at each sampling point during each compliance period beginning in the compliance period starting January 1, 1993, (once every three years).

(b) SW Sampling Frequency: Surface water systems (or combined surface/ground) shall take one sample annually at each sampling point beginning January 1, 1993.

(3) Sampling Protocol: Monitoring shall be conducted as follows:

(a) Ground Water Sampling Points: Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point) beginning in the compliance period starting January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(b) Surface Water Sampling Points: Surface water systems (Note: For purposes of 310 CMR 22.06A(3)(b), surface water systems include systems with a combination of surface and ground sources.) shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point) beginning in the compliance period beginning January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(c) Multiple Sources: If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

(4) Sodium Reporting: The supplier of water shall report to the Department the results of the analyses for sodium within the first ten days of the month following the month in which the sample results were received or within the first ten days following the end of the required monitoring period, whichever comes first.

(5) Sodium Notification: The supplier of water shall report the level of sodium for each source to the local Boards of Health and Massachusetts Department of Public Health by written notice by direct mail within 30 days after the supplier of water first learns of the analytic results which indicate a level of sodium.

(6) Sampling Schedules: Each public water system shall monitor at the time designated by the Department during each compliance period.

(7) Sodium Analysis Analytical Methods: Analysis for sodium shall be conducted using the following method:

SODIUM ANALYTICAL METHODS

		Reference (Method Number)	
Contaminant	Methodology[4]	EPA[1]	SM[2]
Sodium	Inductively-coupled Plasma	200.7	--
	Atomic absorption; direct aspiration	--	3111B

1 - "Methods for the Determination of Metals in Environmental Samples - Supplement I", EPA-600/r-94/111, May 1994. Available at NTIS, PB-95-125472.

2 - "Standard Methods for the Examination of Water and Wastewater," 18th and 19th edition, American Public Health Association, 1992 and 1995, only - not the 20th edition.

3 - For approved analytical procedures for metals, the technique applicable to total metals must be used.

22.06B: Control of Lead and Copper in Drinking Water

(1) General Requirements.

(a) Applicability and Effective Dates.

1. The requirements of 310 CMR 22.06B constitute the Massachusetts drinking water regulations for lead and copper. Unless otherwise indicated, each of the provisions of 310 CMR 22.06B applies to community water systems and non-transient, non-community water systems (hereinafter referred to as "water systems" or "systems").

2. The requirements set forth in 310 CMR 22.06B(7) through 310 CMR 22.06(B)(12) shall take effect July 7, 1992. The requirements in 310 CMR 22.06B(1) through 310 CMR 22.06B(6) shall take effect December 7, 1992.

(b) Scope. 310 CMR 22.06B establishes a treatment technique for lead and copper that includes requirements for corrosion control treatment, source water treatment, lead service line replacement, and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples collected at consumers' taps.

22.06B: continued

(c) Lead and Copper Action Levels:

1. The lead action level is exceeded if the concentration of lead in more than 10% of tap water samples collected during any monitoring period conducted in accordance with 310 CMR 22.06B(7) is greater than 0.015 mg/L (i.e., if the "90th percentile" lead level is greater than 0.015 mg/L).

2. The copper action level is exceeded if the concentration of copper in more than 10% of tap water samples collected during any monitoring period conducted in accordance with 310 CMR 22.06B(7) is greater than 1.3 mg/L (i.e., if the "90th percentile" copper level is greater than 1.3 mg/L).

3. The 90th percentile lead and copper levels shall be computed as follows:

a. The results of all lead or copper samples taken during a monitoring period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.

b. The number of samples taken during the monitoring period shall be multiplied by 0.9.

c. The contaminant concentration in the numbered sample yielded by the calculation in 310 CMR 22.06B(1)(c)3.b. is the 90th percentile contaminant level.

d. For water systems serving fewer than 100 people that collect five samples per monitoring period, the 90th percentile is computed by taking the average of the highest and second highest concentrations.

(d) Corrosion Control Treatment Requirements.

1. All water systems shall install and operate optimal corrosion control treatment as defined in 310 CMR 22.02.

2. Any water system that complies with the applicable corrosion control treatment requirements specified by the Department under 310 CMR 22.06B(2) and (3) shall be deemed in compliance with the treatment requirement contained in 310 CMR 22.06B(1)(d)1.

(e) Source Water Treatment Requirements. Any system exceeding the lead or copper action level shall implement all applicable source water treatment requirements specified by the Department under 310 CMR 22.06B(4).

(f) Lead Service Line Replacement Requirements. Any system exceeding the lead action level after implementation of applicable corrosion control and source water treatment requirements shall complete the lead service line replacement requirements contained in 310 CMR 22.06B(5).

(g) Public Education Requirements. Any system exceeding the lead action level shall implement the public education requirements contained in 310 CMR 22.06B(6).

(h) Monitoring and Analytical Requirements. Tap water monitoring for lead and copper, monitoring for water quality parameters, source water monitoring for lead and copper, and analyses of the monitoring results under this subpart shall be completed in compliance with 310 CMR 22.06B(7) through 310 CMR 22.06B(10).

(i) Reporting Requirements. Systems shall report to the Department any information required by the treatment provisions of this subpart and 310 CMR 22.06B(11).

(j) Recordkeeping Requirements. Systems shall maintain records in accordance with 310 CMR 22.06B(12).

(k) Violation of National Primary Drinking Water Regulations. Failure to comply with the applicable requirements of 310 CMR 22.06B(1) through (12), including requirements established by the Department pursuant to 310 CMR 22.00 shall constitute a violation of the national primary drinking water regulations for lead and/or copper.

(2) Applicability of corrosion control treatment steps to small, medium-size and large water systems.

(a) Systems shall complete the applicable corrosion control treatment requirements described in 310 CMR 22.06B(3) by the deadlines established in 310 CMR 22.06B.

1. A large system (serving >50,000 persons) shall complete the corrosion control treatment steps specified in 310 CMR 22.06B(2)(d), unless it is deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)2. or (b)3.

22.06B: continued

2. A small system (serving ≤3300 persons) and a medium size system (serving >3,300 and ≤50,000 persons) shall complete the corrosion control treatment steps specified in 310 CMR 22.06B(2)(e), unless it is deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)1., (b)2., or (b)3.

(b) A system is deemed to have optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in 310 CMR 22.06B if the system satisfies one of the criteria specified in 310 CMR 22.06(2)(b)1. through 3.. Any such system deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b), and which has treatment in place, shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the Department determines appropriate to ensure that optimal corrosion control is maintained.

1. A small or medium-size water system is deemed to have optimized corrosion control if the system meets the lead and copper action levels during each of two consecutive six-month monitoring periods conducted in accordance with 310 CMR 22.06B(7).

2. Any water system may be deemed by the Department to have optimized corrosion control treatment if the system demonstrates to the satisfaction of the Department that it has conducted activities equivalent to the corrosion control steps applicable to such system under 310 CMR 22.06B. If the Department makes this determination, it shall provide the system with written notice explaining the basis for its decision and shall specify the water quality control parameters representing optimal corrosion control in accordance with 310 CMR 22.06B(3)(f). Water systems deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)2. shall operate in compliance with Department-designated optimal water quality control parameters in accordance with 310 CMR 22.06B(3)(g) and continue to conduct lead and copper tap and water quality parameter sampling in accordance with 310 CMR 22.06B(7)(d)3. and 310 CMR 22.06B(8)(d), respectively. A system shall provide the Department with the following information in order to support a determination under 310 CMR 22.06B(2)(b)2.:

a. the results of all test samples collected for each of the water quality parameters in 310 CMR 22.06B(3)(c)3.

b. a report explaining the test methods used by the water system to evaluate the corrosion control treatments listed in 310 CMR 22.06B(3)(c)1., the results of all tests conducted, and the basis for the system's selection of optimal corrosion control treatment;

c. a report explaining how corrosion control has been installed and how it is being maintained to insure minimal lead and copper concentrations at consumers' taps; and

d. the results of tap water samples collected in accordance with 310 CMR 22.06B(7) at least once every six months for one year after corrosion control has been installed.

3. Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with 310 CMR 22.06B(7) and source water monitoring conducted in accordance with 310 CMR 22.06B(9) that demonstrates for two consecutive six-month monitoring periods that the difference between the 90th percentile tap water lead level computed under 310 CMR 22.06B(1)(c)3. and the highest source water lead concentration, is less than the Practical Quantitation Level (PQL) for lead specified in 310 CMR 22.06B(10)(a)1.b.

a. Those systems whose highest source water lead level is below the Method Detection Limit may also be deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)3.a. if the 90th percentile tap water lead level is less than or equal to the Practical Quantitation Level for lead for two consecutive six-month monitoring periods.

b. Any water system deemed to have optimized corrosion control in accordance with 310 CMR 22.06B(2)(b)3.b. shall continue monitoring for lead and copper at the tap no less frequently than once every three calendar years using the reduced number of sites specified in 310 CMR 22.06B(7)(c) and collecting the samples at times and locations specified in 310 CMR 22.06B(7)(d)4.d.. Any such system that has not conducted a round of monitoring pursuant to 310 CMR 22.06(B)(7)(d) since September 30, 1997, shall complete a round of monitoring pursuant to 310 CMR 22.06B(2)(b)3.b. no later than September 30, 2000.

22.06B: continued

c. Any water system deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)3.c. shall notify the Department in writing pursuant to 310 CMR 22.06(B)(11)(a)3. of any change in treatment or the addition of a new source. The Department may require any such system to conduct additional monitoring or to take other action the Department deems appropriate to ensure that such systems maintain minimal levels of corrosion in the distribution system.

d. As of July 12, 2001, a system is not deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)3.d., and shall install corrosion control treatment pursuant to 310 CMR 22.06B(2)(b)3.e. unless it meets the copper action level.

e. Any system triggered into corrosion control because it is no longer deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)3.e. shall implement corrosoion control treatment in accordance with the deadlines in 310 CMR 22.06B(2)(e). Any such large system shall adhere to the schedule specified in 310 CMR 22.06B(2)(e) for medium-size systems, with the time periods for completing each step being triggered by the date the system is no longer deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)3.e.

(c) Any small or medium-size water system that is required to complete the corrosion control steps due to its exceedance of the lead or copper action level may cease completing the treatment steps whenever the system meets both action levels during each of two consecutive monitoring periods conducted pursuant to 310 CMR 22.06B(7) and submits the results to the Department. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the system (or the Department, as the case may be) shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety. The Department may require a system to repeat treatment steps previously completed by the system where the Department determines that this is necessary to implement properly the treatment requirements of 310 CMR 22.06B. The Department shall notify the system in writing of such a determination and explain the basis for its decision. The requirement for any small or medium size system to implement corrosion control treatment steps in accordance with 310 CMR 22.06(B)(2)(e) (including systems deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)(l)) is triggered whenever any small-or medium-sized system exceeds the lead or copper action level.

(d) Treatment Steps and Deadlines for Large Systems. Except as provided in 310 CMR 22.06B(2)(b)2. and 3., large systems shall complete the following corrosion control treatment steps (described in the referenced portions of 310 CMR 22.06B(3), (7), and (8)) by the indicated dates.

1. Step 1: The system shall conduct initial monitoring as specified in 310 CMR 22.06B(7)(d)1 and 310 CMR 22.06B(8)(b) during two consecutive six-month monitoring periods by January 1, 1993.
2. Step 2: The system shall complete corrosion control studies (310 CMR 22.06B(3)(c)) by July 1, 1994.
3. Step 3: The Department shall designate optimal corrosion control treatment (310 CMR 22.06B(3)(d)) by January 1, 1995.
4. Step 4: The system shall install optimal corrosion control treatment (310 CMR 22.06B(3)(e)) by January 1, 1997.
5. Step 5: The system shall complete follow-up sampling (310 CMR 22.06B(7)(d)2. and 310 CMR 22.06B(8)(c)) by January 1, 1998.
6. Step 6: The Department shall review installation of treatment and designate optimal water quality control parameters (310 CMR 22.06B(3)(f)) by July 1, 1998.
7. Step 7: The system shall operate in compliance with the Department-specified optimal water quality control parameters (310 CMR 22.06B(3)(g)) and continue to conduct tap sampling (310 CMR 22.06B(7)(d)3 and 310 CMR 22.06B(8)(d)).

(e) Treatment Steps and Deadlines for Small and Medium-size Systems. Except as provided in 310 CMR 22.06B(2)(b), small and medium-size systems shall complete the following corrosion control treatment steps (described in the referenced portions of 310 CMR 22.06B(3), 310 CMR 22.06B(7), and 310 CMR 22.06B(8)) by the indicated time periods.

22.06B: continued

1. Step 1: The system shall conduct initial tap sampling (310 CMR 22.06B(7)(d)1. and 310 CMR 22.06B(8)(b)) until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under 310 CMR 22.06B(7)(d)4. A system exceeding the lead or copper action level shall recommend optimal corrosion control treatment (310 CMR 22.06B(3)(a)) within six months after the end of the monitoring period during which it exceeds one of the action levels.

2. Step 2: Within 12 months after the end of a monitoring period during which a system exceeds the lead or copper action level, the Department may require the system to perform corrosion control studies (310 CMR 22.06B(3)(b)). If the Department does not require the system to perform such studies, the Department shall specify optimal corrosion control treatment (310 CMR 22.06B(3)(d)) within the following timeframes:

   a. for medium-size systems, within 18 months after such system exceeds the lead or copper action level,

   b. for small systems, within 24 months after such system exceeds the lead or copper action level.

3. Step 3: If the Department requires a system to perform corrosion control studies under step 2, the system shall complete the studies (310 CMR 22.06B(3)(c)) within 18 months after the Department requires that such studies be conducted.

4. Step 4: If the system has performed corrosion control studies under step 2, the Department shall designate optimal corrosion control treatment (310 CMR 22.06B(3)(d)) within six months after completion of step 3.

5. Step 5: The system shall install optimal corrosion control treatment (310 CMR 22.06B(3)(e)) within 24 months after the Department designates such treatment.

6. Step 6: The system shall complete follow-up sampling (310 CMR 22.06B(7)(d)2 and 310 CMR 22.06B(8)(c)) within 36 months after the Department designates optimal corrosion control treatment.

7. Step 7: The Department shall review the system's installation of treatment and designate optimal water quality control parameters (310 CMR 22.06B(3)(f)) within six months after completion of step 6.

8. Step 8: The system shall operate in compliance with the Department-designated optimal water quality control parameters (310 CMR 22.06B(3)(g) and continue to conduct tap sampling (310 CMR 22.06B(7)(d)3. and 310 CMR 11.05B(8)(d)).

(3) Description of Corrosion Control Treatment Requirements. Each system shall complete the corrosion control treatment requirements described in 310 CMR 22.06B(3)(a) through (h) which are applicable to such system under 310 CMR 22.06B(2).

(a) System Recommendation Regarding Corrosion Control Treatment. Based upon the results of lead and copper tap monitoring and water quality parameter monitoring, small and medium-size water systems exceeding the lead or copper action level shall recommend installation of one or more of the corrosion control treatments listed in 310 CMR 22.06B(3)(c)1. which the system believes constitutes optimal corrosion control for that system. The Department may require the system to conduct additional water quality parameter monitoring in accordance with 310 CMR 22.06B(8)(b) to assist the Department in reviewing the system's recommendation.

(b) Department Decision to Require Studies of Corrosion Control Treatment (Applicable to Small and Medium-size Systems). The Department may require any small or medium-size system that exceeds the lead or copper action level to perform corrosion control studies under 310 CMR 22.06B(2)(c) to identify optimal corrosion control treatment for the system.

(c) Performance of Corrosion Control Studies.

1. Any public water system performing corrosion control studies shall evaluate the effectiveness of each of the following treatments, and, if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for that system:

   a. alkalinity and pH adjustment;

   b. calcium hardness adjustment; and

   c. the addition of a phosphate or silicate based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples.

2. The water system shall evaluate each of the corrosion control treatments using either pipe rig/loop tests, metal coupon tests, partial-system tests, or analyses based on documented analogous treatments with other systems of similar size, water chemistry and distribution system configuration.

22.06B: continued

3. The water system shall measure the following water quality parameters in any tests conducted under 310 CMR 22.06B(3)(c)3. before and after evaluating the corrosion control treatments listed above:

a. lead;
b. copper;
c. pH;
d. alkalinity;
e. calcium;
f. conductivity;
g. orthophosphate (when an inhibitor containing a phosphate compound is used);
h. silicate (when an inhibitor containing a silicate compound is used);
i. water temperature.

4. The water system shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and document such constraints with at least one of the following:

a. data and documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another water system with comparable water quality characteristics; and/or

b. data and documentation demonstrating that the water system has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes.

5. The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes.

6. On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the Department in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in 310 CMR 22.06B(3)(c)1. through 5.

(d) Department Designation of Optimal Corrosion Control Treatment.

1. Based upon consideration of available information including, where applicable, studies performed under 310 CMR 22.06B(3)(c) and a system's recommended treatment alternative, the Department shall either approve the corrosion control treatment option recommended by the system, or designate alternative corrosion control treatment(s) from among those listed in 310 CMR 22.06B(3)(c)1. When designating optimal treatment the Department shall consider the effects that additional corrosion control treatment may have on water quality parameters and on other water quality treatment processes.

2. The Department shall notify the system of its decision on optimal corrosion control treatment in writing and explain the basis for this determination. If the Department requests additional information to aid its review, the water system shall provide the information.

(e) Installation of Optimal Corrosion Control. Each system shall properly install and operate throughout its distribution system the optimal corrosion control treatment designated by the Department under 310 CMR 22.06B(3)(d).

(f) Department Review of Treatment and Specification of Optimal Water Quality Control Parameters. The Department shall evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the water system and determine whether the system has properly installed and operated the optimal corrosion control treatment designated by the Department in 310 CMR 22.06B(3)(d). Upon reviewing the results of tap water and water quality parameter monitoring by the system, both before and after the system installs optimal corrosion control treatment, the Department shall designate:

1. a minimum value or a range of values for pH measured at each entry point to the distribution system;

2. a minimum pH value, measured in all tap samples. Such value shall be equal to or greater than 7.0, unless the Department determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control;

3. if a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, that the Department determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system;

22.06B: continued

4. if alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples;

5. if calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples. The values for the applicable water quality control parameters listed above shall be those that the Department determines to reflect optimal corrosion control treatment for the system. The Department may designate values for additional water quality control parameters determined by the Department to reflect optimal corrosion control for the system. The Department shall notify the system in writing of these determinations and explain the basis for its decisions.

(g) Continued Operation and Monitoring. All systems optimizing corrosion control shall continue to operate and maintain optimum corrosion control treatment, including maintaining water quality control parameters at or above minimum values or within ranges designated by the Department under 310 CMR 22.06B(3)(f), in accordance with 310 CMR 22.06B(3)(g) for all samples collected under 310 CMR 22.06B(8)(d) through (f). Compliance with the requirements of 310 CMR 22.06B(3)(g) shall be determined every six months, as specified under 310 CMR 22.06B(8)(d). A water system is out of compliance with the requirements of 310 CMR 22.06B(3)(g) for a six-month period if it has excursions for any Department-specified parameter for more than nine days during the period. An excursion occurs whenever the daily value for one or more of the water quality control parameters measured at a sampling location is below the minimum value or outside the range designated by the Department. Daily values are calculated as follows.

1. On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the average of all results collected during the day regardless of whether they are collected through continuous monitoring, grab sampling, or a combination of both.

2. On the days when only one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the result of that measurement.

3. On days when no measurement is collected for the water quality parameter at the sampling location, the daily value shall be the daily value calculated on the most recent day on which the water quality was measured at the sample site. To minimize the number of days counted as excursions, a system should take a confirmation sample as soon as possible when a daily value is below the minimum value or outside the range designated by the Department. The Department has the discretion to delete results of obvious sampling errors from this calculation.

(h) Modification of Department Treatment Decisions. Upon its own initiative or in response to a reasonable request by a water system or other interested party, the Department may modify its determination of the optimal corrosion control treatment under 310 CMR 22.06B(3)(d) or optimal water quality control parameters under 310 CMR 22.06B(3)(d)(f). A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The Department may modify its determination where it concludes that such change is necessary to ensure that the system continues to optimize corrosion control treatment. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the Department's decision, and provide an implementation schedule for completing the treatment modifications.

(4) Source Water Treatment Requirements. Systems shall complete the applicable source water monitoring and treatment requirements (described in the referenced portions of 310 CMR 22.06B(3)(b), and in 310 CMR 22.06B(7) and (9)) by the following deadlines.

(a) Deadlines for Completing Source Water Treatment Steps.

1. Step 1: A system exceeding the lead or copper action level shall complete lead and copper source water monitoring (310 CMR 22.06B(9)(b)) and make a treatment recommendation to the Department (310 CMR 22.06B(4)(b)1.) within six months after exceeding the lead or copper action level.

2. Step 2: The Department shall make a determination regarding source water treatment (310 CMR 22.06B(4)(b)2.) within six months after submission of monitoring results under Step 1.

22.06B: continued

3. Step 3: If the Department requires installation of source water treatment, the system shall install the treatment (310 CMR 22.06B(4)(b)3.) within 24 months after completion of Step 2.

4. Step 4: The system shall complete follow-up tap water monitoring (310 CMR 22.06B(7)(d)2.) and source water monitoring (310 CMR 22.06B(9)(c)) within 36 months after completion of Step 2.

5. Step 5: The Department shall review the system's installation and operation of source water treatment and specify maximum permissible source water levels (310 CMR 22.06B(4)(b)4.) within six months after completion of step 4.

6. Step 6: The system shall operate in compliance with the Department-specified maximum permissible lead and copper source water levels (310 CMR 22.06B(4)(b)4.) and continue source water monitoring (310 CMR 22.06B(9)(d)).

(b) Description of Source Water Treatment Requirements.

1. System Treatment Recommendation. Any system which exceeds the lead or copper action level shall recommend in writing to the Department the installation and operation of one of the source water treatments listed in 310 CMR 22.06B(4)(b)2. A system may recommend that no treatment be installed based upon a demonstration that source water treatment is not necessary to minimize lead and copper levels at users' taps.

2. Department Determination Regarding Source Water Treatment. The Department shall complete an evaluation of the results of all source water samples submitted by the water system to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to users' taps. If the Department determines that treatment is needed, the Department shall either require installation and operation of the source water treatment recommended by the system (if any) or require the installation and operation of another source water treatment from among the following: ion exchange, reverse osmosis, lime softening or coagulation/filtration. If the Department requests additional information to aid in its review, the water system shall provide the information by the date specified by the Department in its request. The Department shall notify the system in writing of its determination and set forth the basis for its decision.

3. Installation of Source Water Treatment. Each system shall properly install and operate the source water treatment designated by the Department under 310 CMR 22.06B(4)(b)2.

4. Department Review of Source Water Treatment and Specification of Maximum Permissible Source Water Levels. The Department shall review the source water sample analysis taken by the water system both before and after the system installs source water treatment, and determine whether the system has properly installed and operated the source water treatment designated by the Department. Based upon its review, the Department shall designate the maximum permissible lead and copper concentrations for finished water entering the distribution system. Such levels shall reflect the contaminant removal capability of the treatment properly operated and maintained. The Department shall notify the system in writing and explain the basis for its decision.

5. Continued Operation and Maintenance. Each water system shall maintain source water lead and copper levels below 0.005 mg/L and 0.65 mg/L respectively at each sampling point monitored in accordance with 310 CMR 22.06B(9). The system is out of compliance with 310 CMR 22.06B(9). if the level of lead or copper at any source water sampling point is greater than 0.005 mg/L for lead or 0.65 mg/L for copper.

6. Modification of Department Treatment Decisions. Upon its own initiative or in response to a request by a water system or other interested party, the Department may modify its determination of the source water treatment under 310 CMR 22.06B(4)(b)2., or maximum permissible lead and copper concentrations for finished water entering the distribution system under 310 CMR 22.06B(4)(b)4. A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The Department may modify its determination where it concludes that such change is necessary to ensure that the system continues to minimize lead and copper concentrations in source water. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the Department's decision, and provide an implementation schedule for completing the treatment modifications.

22.06B: continued

(5) Lead Service Line Replacement Requirements.

(a) Systems that fail to meet the lead action level in tap samples taken pursuant to 310 CMR 22.06B(7)(d)2., after installing corrosion control and/or source water treatment (whichever sampling occurs later), shall replace lead service lines in accordance with the requirements of 310 CMR 22.06B(5). If a system is in violation of 310 CMR 22.06B(2) or (4) for failure to install source water or corrosion control treatment, the Department may require the system to commence lead service line replacement under 310 CMR 22.06B(5) after the date by which the system was required to conduct monitoring under 310 CMR 22.06B(7)(d)2. has passed.

(b) A water system shall replace annually at least 7% of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins. The system shall identify the initial number of lead service lines in its distribution system, including an identification of the portion(s) owned by the system, based on a materials evaluation, including the evaluation required under 310 CMR 22.06B(7)(a) and relevant legal authorities (e.g. contracts, local ordinances) regarding the portion owned by the system. The first year of lead service line replacement shall begin on the date the action level was exceeded in tap sampling referenced in 310 CMR 22.06B(5)(a).

(c) A system is not required to replace an individual lead service line if the lead concentration in all service line samples from that line, taken pursuant to 310 CMR 22.06B(7)(b)3. is less than or equal to 0.015 mg/L.

(d) A water system shall replace that portion of the lead service line that it owns. In cases where the system does not own the entire lead service line, the system shall notify the owner of the line, or the owner's authorized agent, that the system will replace the portion of the service line that it owns and shall offer to replace the owner's portion of the line. A system is not required to bear the cost of replacing the privately-owned portion of the line, nor is it required to replace the privately-owned portion where the owner chooses not to pay the cost of replacing the privately-owned portion of the line, or where replacing the privately-owned portion would be precluded by State, local or common law. A water system that does not replace the entire length of the service line also shall complete the following tasks.

1. At least 45 days prior to commencing with the partial replacement of a lead service line, the water system shall provide notice to the resident(s) of all buildings served by the line explaining that they may experience a temporary increase of lead levels in their drinking water, along with guidance on measures consumers can take to minimize their exposure to lead. The Department may allow the water system to provide notice under the previous sentence less than 45 days prior to commencing partial lead service line replacement where such replacement is in conjunction with emergency repairs. In addition, the water system shall inform the resident(s) served by the line that the system will, at the system's expense, collect a sample from each partially-replaced lead service line that is representative of the water in the service line for analysis of lead content, as prescribed under 310 CMR 22.06B(7)(b)3., within 72 hours after the completion of the partial replacement of the service line. The system shall collect the sample and report the results of the analysis to the owner and the resident(s) served by the line within three business days of receiving the results. Mailed notices post-marked within three business days of receiving the results shall be considered "on time."

2. The water system shall provide the information required by 310 CMR 22.06B(5)(d)1. to the residents of individual dwellings by mail or by methods approved by the Department. In instances where multi-family dwellings are served by the line, the water system shall have the option to post the information at a conspicuous location.

(e) The Department shall require a system to replace lead service lines on a shorter schedule than that required by 310 CMR 22.06B(5), taking into account the number of lead service lines in the system, where such a shorter replacement schedule is feasible. The Department shall make this determination in writing and notify the system of its finding within six months after the system is triggered into lead service line replacement based on monitoring referenced in 310 CMR 22.06B(5)(a).

(f) Any system may cease replacing lead service lines whenever first draw samples collected pursuant to 310 CMR 22.06B(7)(d)3. meet the lead action level during each of two consecutive monitoring periods and the system submits the results to the Department. If first draw samples collected in any such water system thereafter exceeds the lead action level, the system shall recommence replacing lead service lines, pursuant to 310 CMR 22.06B(5)(b).

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(g) To demonstrate compliance with 310 CMR 22.06B(5)(a) through (d), a system shall report to the Department the information specified in 310 CMR 22.06B(11)(e).

(6) Public Education and Supplemental Monitoring Requirements. A water system that exceeds the lead action level based on tap water samples collected in accordance with 310 CMR 22.06B(7) shall deliver the public education materials in accordance with 310 CMR 22.06B(6)(a) and (b) to its consumers in accordance with the requirements in 310 CMR 22.06B(6)(c).

(a) Content of Written Public Education Materials.

1. Community Water Systems. A community water system shall include the text provided in 310 CMR 22.06B(6)(a)1.a. through d.(v) in all of the printed materials it distributes through its lead public education program. A system may delete information pertaining to lead service lines upon approval by the Department, if no lead service lines exist anywhere in the water system service area. Public education language at 310 CMR 22.06B(6)(a)1.d(ii)vi. and 310 CMR 22.06B(6)(a)d(iv)ii. may be modified regarding building permit record availability and consumer access to these records, if approved by the Department. A system may also continue to utilize pre-printed materials that meet the public education requirements in 310 CMR 22.06B(6), effective November 20, 1992. Any additional information presented by a system shall be consistent with the information below and be in plain English that can be understood by lay people.

a. "Introduction. The United States Environmental Protection Agency (EPA) and (insert name of water supplier) are concerned about lead in your drinking water. Although most homes have very low levels of lead in their drinking water, some homes in the community have lead levels above the EPA action level of 15 parts per billion (ppb), or 0.015 milligrams of lead per liter of water (mg/L). Under Federal law we are required to have a program in place to minimize lead in your drinking water by (insert date when corrosion control will be completed for your system). This program includes corrosion control treatment, source water treatment, and public education. We are also required to replace each lead service line that we own if the line contributes lead concentrations of more than 15 ppb after we have completed the comprehensive treatment program. If you have any questions about how we are carrying out the requirements of the lead regulation please give us a call at (insert water system's phone number). This brochure explains the simple steps you can take to protect you and your family by reducing your exposure to lead in drinking water."

b. "Health Effects of Lead. Lead is a common metal found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery porcelain and pewter, and water. Lead can pose a significant risk to your health if too much of it enters your body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells and kidneys. The greatest risk is to young children and pregnant women. Amounts of lead that won't hurt adults can slow down normal mental and physical development of growing bodies. In addition, a child at play often comes into contact with sources of lead contamination -- like dirt and dust -- that rarely affect an adult. It is important to wash children's hands and toys often, and to try to make sure they only put food in their mouths."

c. "Lead in Drinking Water.

(i) Lead in drinking water, although rarely the sole cause of lead poisoning, can significantly increase a person's total lead exposure, particularly the exposure of infants who drink baby formulas and concentrated juices that are mixed with water. The EPA estimates that drinking water can make up 20% or more of a person's total exposure to lead.

(ii) Lead is unusual among drinking water contaminants in that it seldom occurs naturally in water supplies like rivers and lakes. Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing. These materials include lead-based solder used to join copper pipe, brass and chrome plated brass faucets, and in some cases, pipes made of lead that connect your house to the water main (service lines). In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8.0%.

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(iii) When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon after returning from work or school, can contain fairly high levels of lead."

d. "Steps You Can Take in the Home to Reduce Exposure to Lead in Drinking Water.

(i) Despite our best efforts mentioned earlier to control water corrosivity and remove lead from the water supply, lead levels in some homes or buildings can be high. To find out whether you need to take action in your own home, have your drinking water tested to determine if it contains excessive concentrations of lead. Testing the water is essential because you cannot see, taste, or smell lead in drinking water. Some local laboratories that can provide this service are listed at the end of this booklet. For more information on having your water tested, please call (insert phone number of water system).

(ii) If a water test indicates that the drinking water drawn from a tap in your home contains lead above 15 ppb, then you should take the following precautions:

i. Let the water run from the tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than six hours. The longer water resides in your home's plumbing the more lead it may contain. Flushing the tap means running the cold water faucet until the water gets noticeably colder, usually about 15-30 seconds. If your house has a lead service line to the water main, you may have to flush the water for a longer time, perhaps one minute, before drinking. Although toilet flushing or showering flushes water through a portion of your home's plumbing system, you still need to flush the water in each faucet before using it for drinking or cooking. Flushing tap water is a simple and inexpensive measure you can take to protect your family's health. It usually uses less than one or two gallons of water and costs less than (insert a cost estimate based on flushing two times a day for 30 days) per month. To conserve water, fill a couple of bottles for drinking water after flushing the tap, and whenever possible use the first flush water to wash the dishes or water the plants. If you live in a high-rise building, letting the water flow before using it may not work to lessen your risk from lead. The plumbing systems have more, and sometimes larger pipes than smaller buildings. Ask your landlord for help in locating the source of the lead and for advice on reducing the lead level.

ii. Try not to cook with, or drink water from the hot water tap. Hot water can dissolve more lead more quickly than cold water. If you need hot water, draw water from the cold tap and heat it on the stove.

iii. Remove loose lead solder and debris from the plumbing materials installed in newly constructed homes, or homes in which the plumbing has recently been replaced, by removing the faucet strainers from all taps and running the water from three to five minutes. Thereafter, periodically remove the strainers and flush out any debris that has accumulated over time.

iv. If your copper pipes are joined with lead solder that has been installed illegally since it was banned in 1986, notify the plumber who did the work and request that he or she replace the lead solder with lead-free solder. Lead solder looks dull gray, and when scratched with a key looks shiny. In addition, notify the Department of Environmental Protection about the violation.

v. Determine whether or not the service line that connects your home or apartment to the water main is made of lead. The best way to determine if your service line is made of lead is by either hiring a licensed plumber to inspect the line or by contacting the plumbing contractor who installed the line. You can identify the plumbing contractor by checking the city's record of building permits which should be maintained in the files of the (insert name of department that issues building permits). A licensed plumber can at the same time check to see if your home's plumbing contains lead solder, lead pipes, or pipe fittings that contain lead. The public water system that delivers water to your home should also maintain records of the materials located in

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the distribution system. If the service line that connects your dwelling to the water main contributes more than 15 ppb to drinking water, after our comprehensive treatment program is in place, we are required to replace the line. If the line is only partially owned by the (insert name of the city, county, or water system that owns the line), we are required to provide the owner of the privately owned portion of the line with information on how to replace the privately owned portion of the service line, and offer to replace that portion of the line at the owner's expense. If we replace only a portion of the line that we own we are also required to notify the owner in advance and provide the owner with the information on the steps the owner can take to minimize exposure to any temporary increase in lead levels that may result from the partial replacement, to take a follow-up sample at our expense from the line within 72 hours after the partial replacement, and to mail or otherwise provide the owner with the results of that sample within three business days of receiving the results. Acceptable replacement alternatives include copper, steel, iron, and plastic pipes.

vi. Have an electrician check your wiring. If grounding wires from the electrical system are attached to your pipes, corrosion may be greater. Check with a licensed electrician or your local electrical code to determine if your wiring can be grounded elsewhere. DO NOT attempt to change the wiring yourself because improper grounding can cause electrical shock and fire hazards.

(iii) The steps described above will reduce the lead concentrations in your drinking water. However, if a water test indicates that the drinking water coming from your tap contains lead concentrations in excess of 15 ppb after flushing, or after we have completed our actions to minimize lead levels, then you may want to take the following additional measures:

i. Purchase or lease a home treatment device. Home treatment devices are limited in that each unit treats only the water that flows from the faucet to which it is connected, and all of the devices require periodic maintenance and replacement. Devices such as reverse osmosis systems or distillers can effectively remove lead from your drinking water. Some activated carbon filters may reduce lead levels at the tap, however all lead reduction claims should be investigated. Be sure to check the actual performance of a specific home treatment device before and after installing the unit.

ii. Purchase bottled water for drinking and cooking.

(iv) You can consult a variety of sources for additional information. Your family doctor or pediatrician can perform a blood test for lead and provide you with information about the health effects of lead. Department and local government agencies that can be contacted include:

i. (insert the name of city or county department of public utilities) at (insert phone number) can provide you with information about your community's water supply, and a list of local laboratories that have been certified by EPA for testing water quality;

ii. (insert the name of city or county department that issues building permits) at (insert phone number) can provide you with information about building permit records that should contain the names of plumbing contractors that plumbed your home; and

iii. (insert the name of the Department of Public Health) at (insert phone number) or the (insert the name of the city or county health department) at (insert phone number) can provide you with information about the health effects of lead and how you can have your child's blood tested.

(v) The following is a list of some Department approved laboratories in your area that you can call to have your water tested for lead. (Insert names and phone numbers of at least two laboratories)."

2. Non-transient Non-community Water Systems. A non-transient non-community water system shall either include the text specified in 310 CMR 22.06(B)(6)(a)1. or shall include the text contained in 310 CMR 22.06B(6)(a)2. in all of the printed materials it distributes to consumers through its lead public education program. Water systems may delete information pertaining to lead service lines upon approval by the Department if no lead service lines exist anywhere in the water system service area. Any additional information presented by a system shall be consistent with the information contained in 310 CMR 22.06B(6)(a)2. and be in plain English that can be understood by lay people.

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a. "Introduction. The United States Environmental Protection Agency (EPA) and [insert name of water supplier] are concerned about lead in your drinking water. Some drinking water samples taken from this facility have lead levels above the EPA action level of 15 parts per billion (ppb), or 0.015 milligrams of lead per liter of water (mg/L). Under Federal law we are required to have a program in place to minimize lead in your drinking water by [insert date when corrosion control will be completed for your system]. This program includes corrosion control treatment, source water treatment, and public education. We are also required to replace the portion of each lead service line that we own if the line contributes lead concentrations of more than 15 ppb after we have completed the comprehensive treatment program. If you have any questions about how we are carrying out the requirements of the lead regulation please give us a call at [insert water system's phone number]. This brochure explains the simple steps you can take to protect yourself by reducing your exposure to lead in drinking water."

b. "Health Effects of Lead. Lead is found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery, porcelain and pewter, and water. Lead can pose a significant risk to your health if too much enters your body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells, and kidneys. The greatest risk is to young children and pregnant women. Amounts of lead that won't hurt adults can slow down normal mental and physical development of growing bodies. In addition, a child at play often comes in contact with sources of lead contamination- like dirt and dust- that rarely affect an adult. It is important to wash children's hands and toys often, and to try to make sure they only put food in their mouths."

c. "Lead in Drinking Water.

(i) Lead in drinking water, although rarely the sole cause of lead poisoning, can significantly increase a person's total lead exposure, particularly the exposure of infants who drink baby formulas and concentrated juices that are mixed with water. The EPA estimates that drinking water can make up 20% or more of a person's total exposure to lead.

(ii) Lead is unusual among drinking water contaminants in that it seldom occurs naturally in water supplies like rivers and lakes. Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing. These materials include lead-based solder used to join copper pipe, brass and chrome-plated brass faucets, and in some cases, pipes that are made of lead that connect houses or buildings to water mains (service lines). In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the content of faucets, pipes and other plumbing materials to 8%.

(iii) When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon if the water has not been used all day, can contain fairly high levels of lead."

d. "Steps You Can Take to Reduce Exposure to Lead in Drinking Water.

(i) Let the water run from the tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than six hours. The longer water resides in plumbing the more lead it may contain. Flushing the tap means running the cold water faucet for about 15-30 seconds. Although toilet flushing or showering flushes water through a portion of the plumbing system, you still need to flush the water in each faucet before using it for drinking or cooking. Flushing tap water is a simple and inexpensive measure you can take to protect your health. It usually uses less than one gallon of water.

(ii) Do not cook with, or drink water from the hot water tap. Hot water can dissolve more lead more quickly than cold water. If you need hot water, draw cold water from the tap and then heat it.

(iii) The steps described above will reduce the lead concentrations in your drinking water. However, if you are still concerned, you may wish to use bottled water for drinking and cooking.

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(iv) You can consult a variety of sources for additional information. Your family doctor or pediatrician can perform a blood test for lead and provide you with information about the health effects of lead. State and local government agencies that can be contacted include:

i. The DEP, Drinking Water Program in Boston at 617-292-5770 can provide you with information about your facilty's water supply; and

ii. the Department of Public Health, Lead Exposure Office at 617-284-8400 can provide you with information about the health effects of lead."

(b) Content of Broadcast Materials. Each water system shall include the following information contained in 310 CMR 22.06B(6)(b) in all public service announcements submitted under its lead public education program to television and radio stations for broadcasting:

1. "Why should everyone want to know the facts about lead and drinking water? Because unhealthy amounts of lead can enter drinking water through the plumbing in your home. That's why I urge you to do what I did. I had my water tested for (insert free or $ per sample). You can contact the (insert the name of the city or water system) for information on testing and on simple ways to reduce your exposure to lead in drinking water."

2. "To have your water tested for lead, or to get more information about this public health concern, please call (insert the phone number of the city or water system)."

(c) Delivery of a Public Education Program.

1. In communities where a significant proportion of the population speaks a language other than English, public education materials shall be communicated in the appropriate language(s).

2. A community water system that exceeds the lead action level on the basis of tap water samples collected in accordance with 310 CMR 22.06B(7), and that is not already repeating public education tasks pursuant to 310 CMR 22.06B(6)(c)3., 7., or 8. shall, within 60 days:

a. insert notices in each customer's water utility bill containing the information in 310 CMR 22.06B(6)(a), along with the following alert on the water bill itself in large print: "SOME HOMES IN THIS COMMUNITY HAVE ELEVATED LEAD LEVELS IN THEIR DRINKING WATER. LEAD CAN POSE A SIGNIFICANT RISK TO YOUR HEALTH. PLEASE READ THE ENCLOSED NOTICE FOR FURTHER INFORMATION." A community water system having a billing cycle that does not include billing within 60 days of exceeding the action level, or that cannot insert information in the water utility bill without making major changes to its billing system, may use a separate mailing to deliver the information in 310 CMR 22.6B(6)(a)1. as long as the information is delivered to each customer within 60 days of exceeding the action level. Such water systems shall also include the "alert" language specified in 310 CMR 22.06B(6)(c)2.a.

b. submit the information in 310 CMR 22.06B(6)(a)1.b. and d. to the editorial departments of the major daily and weekly newspapers circulated throughout the community.

c. deliver pamphlets and/or brochures that contain the public education materials in 310 CMR 22.06B(6)(a)1.b. and d. to facilities and organizations, including the following:

(i) public schools and/or local school boards;

(ii) city or county health department;

(iii) Women, Infants, and Children and/or Head Start Program(s) whenever available;

(iv) public and private hospitals and/or clinics;

(v) pediatricians;

(vi) family planning clinics; and

(vii) local welfare agencies.

d. submit the public service announcement in 310 CMR 22.06B(6)(b) to at least five of the radio and television stations with the largest audiences that broadcast to the community served by the water system.

3. A community water system shall repeat the tasks contained in 310 CMR 22.06B(6)(c)2.a., b., and c. every 12 months, and the tasks contained in 310 CMR 22.06B(6)(c)2.d. every six months for as long as the system exceeds the lead action level.

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4. Within 60 days after it exceeds the lead action level level (unless it already is repeating public education tasks pursuant to 310 CMR 22.06B(6)(c)3., a non-transient non-community water system shall deliver the public education materials contained in 310 CMR 22.06B(6)(a)1. or the public education materials specified by 310 CMR 22.06B(6)(a)2. as follows:

a. post informational posters on lead in drinking water in a public place or common area in each of the buildings served by the system; and

b. distribute informational pamphlets and/or brochures on lead in drinking water to each person served by the non-transient non-community water system. The Department may allow the system to utilize electronic transmission in lieu of or combined with printed materials as long as it achieves at least the same coverage.

5. A non-transient non-community water system shall repeat the tasks contained in 310 CMR 22.06B(6)(c)4. at least once during each calendar year in which the system exceeds the lead action level.

6. A water system may discontinue delivery of public education materials if the system has met the lead action level during the most recent six-month monitoring period conducted pursuant to 310 CMR 22.06B(7). Such a system shall recommence public education in accordance with 310 CMR 22.06B if it subsequently exceeds the lead action level during any monitoring period.

7. A community water system may apply to the Department, in writing, (unless the Department has waived the requirement for prior Department approval) to use the text specified in 310 CMR 22.06B(6)(a)2. in lieu of the text in 310 CMR(6)(a)1. and to perform the tasks listed in 310 CMR 22.06B(6)(c)4. and 5. in lieu of the tasks in 310 CMR 22.06B(6)(c)2. and 3. if:

a. The system is a facility, such as a prison or a hospital, where the population served is not capable of or is prevented from making improvements to plumbing or installing point of use treatment devices; and

b. The system provides water as part of the cost of services provided and does not separately charge for water consumption.

8. Community Water Systems Serving 3,300 or Fewer People.

a. A community water system serving 3,300 or fewer people may omit the task contained in 310 CMR 22.06B(6)(c)2.d. as long as it distributes notices containing the information contained in 310 CMR(6)(a)1. to every household served by the system. Such systems may further limit their public education programs as follows:

(i) Systems serving 500 or fewer people may forego the task contained in 310 CMR 22.06B(6)(c)2.b.. Such a system may limit the distribution of the public education materials required under310 CMR 22.06B(6)(c)2.c. to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children, unless it is notified by the Department in writing that it must make a broader distribution.

(ii) If approved by the Department in writing, a system serving 501 to 3,300 people may omit the task in 310 CMR 22.06B(6)(c)2.b. and/or limit the distribution of the public education materials required under 310 CMR 22.06B(6)(c)2.c. to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children.

b. A community water system serving 3,300 or fewer people that delivers public education in accordance with 310 CMR 22.06B(6)(c)8.a. shall repeat the required public education tasks at least once during each calendar year in which the system exceeds the lead action level.

(d) Supplemental Monitoring and Notification of Results.

1. A water system that fails to meet the lead action level on the basis of tap samples collected in accordance with 310 CMR 22.06B(7) shall offer to sample the tap water of any customer who requests it. The system is not required to pay for collecting or analyzing the sample, nor is the system required to collect and analyze the sample itself.

(7) Monitoring Requirements for Lead and Copper in Tap Water.

(a) Sample Site Location.

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1. By the applicable date for commencement of monitoring under 310 CMR 22.06B(7)(d)1., each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of 310 CMR 22.06B(7), and which is sufficiently large to ensure that the water system can collect the number of lead and copper tap samples required in 310 CMR 22.06B(7)(c). All sites from which first draw samples are collected shall be selected from this pool of targeted sampling sites. Sampling sites may not include faucets that have point-of-use or point-of-entry treatment devices designed to remove inorganic contaminants. Once the sampling sites are selected they must be submitted to the Department on the required form for approval.

2. A water system shall use the information on lead, copper, and galvanized steel that it is required to collect under 310 CMR 22.19(5)(6)(7) of this part [special monitoring for corrosivity characteristics) when conducting a materials evaluation. When an evaluation of the information collected pursuant to 310 CMR 22.19(5)(6)(7) is insufficient to locate the requisite number of lead and copper sampling sites that meet the targeting criteria in 310 CMR 22.06B(7)(a), the water system shall review the sources of information listed below in order to identify a sufficient number of sampling sites. In addition, the system shall seek to collect such information where possible in the course of its normal operations (e.g., checking service line materials when reading water meters or performing maintenance activities):

a. all plumbing codes, permits, and records in the files of the building department(s) which indicate the plumbing materials that are installed within publicly and privately owned structures connected to the distribution system;

b. all inspections and records of the distribution system that indicate the material composition of the service connections that connect a structure to the distribution system; and

c. all existing water quality information, which includes the results of all prior analyses of the system or individual structures connected to the system, indicating locations that may be particularly susceptible to high lead or copper concentrations.

3. The sampling sites selected for a community water system's sampling pool ("tier 1 sampling sites") shall consist of single family structures that:

a. contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

b. are served by a lead service line. When multiple-family residences comprise at least 20% of the structures served by a water system, the system may include these types of structures in its sampling pool.

4. Any community water system with insufficient tier 1 sampling sites shall complete its sampling pool with "tier 2 sampling sites", consisting of buildings, including multiple-family residences that:

a. contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

b. are served by a lead service line.

5. Any community water system with insufficient tier 1 and tier 2 sampling sites shall complete its sampling pool with "tier 3 sampling sites", consisting of single family structures that contain copper pipes with lead solder installed before 1983. A community water system with insufficient tier 1, tier 2, and tier 3 sampling sites shall complete its sampling pool with representative sites throughout the distribution system. For the purpose of 310 CMR 22.06B(7)(a)5., a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

6. The sampling sites selected for a non-transient non-community water system ("tier 1 sampling sites") shall consist of buildings that:

a. contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

b. are served by a lead service line.

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7. A non-transient non-community water system with insufficient tier 1 sites that meet the targeting criteria in 310 CMR 22.06B(7)(a)6. shall complete its sampling pool with sampling sites that contain copper pipes with lead solder installed before 1983. If additional sites are needed to complete the sampling pool, the non-transient non-community water system shall use representative sites throughout the distribution system. For the purpose of 310 CMR 22.06B(7)(a)7., a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

8. Any water system whose distribution system contains lead service lines shall draw 50% of the samples it collects during each monitoring period from sites that contain lead pipes, or copper pipes with lead solder, and 50% of the samples from sites served by a lead service line. A water system that cannot identify a sufficient number of sampling sites served by a lead service line shall collect first-draw samples from all of the sites identified as being served by such lines.

9. In addition to the samples required by 310 CMR 22.06B(7) the Department requires community water supplies to collect lead and copper samples from at least two schools. Each school will have two sampling sites from which a 250 ml sample will be taken, one from a kitchen tap and one from a drinking water source such as a water fountain.

(b) Sample Collection Methods.

1. All tap samples for lead and copper collected in accordance with this subpart, with the exception of lead service line samples collected under 310 CMR 22.06B(5)(c) to determine whether or not a lead service line should be replaced and samples collected under 310 CMR 22.06B(7)(b)3., shall be first-draw samples.

2. Each first-draw tap sample for lead and copper shall be one liter and have stood motionless in the plumbing system of each sampling site for at least six hours. First-draw samples from residential housing shall be collected from the cold-water kitchen tap or bathroom sink tap. First-draw samples from a non-residential building shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. Non-first-draw samples collected in lieu of first-draw samples pursuant to 310 CMR 22.06B(7)(b)5. shall be one liter in volume an shall be collected at an interior tap from which water is typically drawn for consumption. First-draw samples may be collected by the system or the system may allow residents to collect first-draw samples after instructing the residents of the sampling procedures specified in 310 CMR 22.06B(7)(b)2. To avoid potential problems of residents handling nitric acid, acidification of first draw samples may be done up to 14 days after the sample has been collected. After acidification to resolubilize the metals, the sample must stand in the original container for the time specified in the approved EPA method before the sample can be analyzed. If a system allows residents to perform sampling, the system may not challenge, based on alleged errors in sample collection, the accuracy of sampling results.

3. Each lead service line sample shall be one liter in volume and have stood motionless in the lead service line for at least six hours, but not more than 12 hours. Lead service line samples, for the purpose of determining whether or not a line should be replaced, shall be collected in one of the following three ways:

a. at the tap after flushing the volume of water between the tap and the lead service line. The volume of water shall be calculated based on the interior diameter and length of the pipe between the tap and the lead service line;

b. tapping directly into the lead service line; or

c. if the sampling site is a building constructed as a single-family residence, allowing the water to run until there is a significant change in temperature which would be indicative of water that has been standing in the lead service line.

4. A water system shall collect each first draw tap sample from the same sampling site from which it collected a previous sample. If, for any reason, the water system cannot gain entry to a sampling site in order to collect a follow-up tap sample, the system may collect the follow-up tap sample from another sampling site in its sampling pool as long as the new site meets the same targeting criteria, and is within reasonable proximity of the original site.

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5. A non-transient non-community water system, or a community water system that meets the criteria of 310 CMR 22.06B(6)(c)7.a. and b., that does not have enough taps that can supply first-draw samples, as defined in 310 CMR 22.06B, may apply to the Department in writing to substitute non-first-draw samples. Such systems shall collect as many first-draw samples from appropriate taps as possible and identify sampling times and locations that would likely result in the longest standing time for the remaining sites. The Department has the discretion to waive the requirement for prior Department approval of non-first-draw sample sites selected by the system, either through State regulation or written notification to the system.

(c) Number of Samples. Water systems shall collect at least one sample during each monitoring period specified in 310 CMR 22.06B(7)(d) from the number of sites listed in the second column ("Standard Monitoring") of the table in 310 CMR 22.06B(7)(c). A system conducting reduced monitoring under 310 CMR 22.06B(7)(d)4. shall collect at lest one sample from the number of sites specified in the third column ("Reduced Monitoring") of the table in 310 CMR 22.06B(7)(c).

System Size (No. People Served)	Number of sites (Standard Monitoring)	Number of sites (Reduced Monitoring)
>100,000	100	50
10,001-100,000	60	30
3,301 to 10,000	40	20
501 to 3,300	20	10
101 to 500	10	5
≤100	5	5

(d) Timing of Monitoring

1. Initial Tap Sampling. The first six-month monitoring period for small, medium-size and large systems shall begin on the following dates:

System Size (No. People Served)	First Six-month Monitoring Period Begins On
>50,000	January 1, 1992
3,301 to 50,000	July 1, 1992
≤3,300	July 1, 1993

a. All large systems shall monitor during two consecutive six-month periods.

b. All small and medium-size systems shall monitor during each six-month monitoring period until:

(i) the system exceeds the lead or copper action level and is therefore required to implement the corrosion control treatment requirements under 310 CMR 22.06B(2), in which case the system shall continue monitoring in accordance with 310 CMR 22.06B(7)(d)2., or

(ii) the system meets the lead and copper action levels during two consecutive six-month monitoring periods, in which case the system may reduce monitoring in accordance with 310 CMR 22.06B(7)(d)4.

2. Monitoring after Installation of Corrosion Control and Source Water Treatment.

a. Any large system which installs optimal corrosion control treatment pursuant to 310 CMR 22.06B(2)(d)4. shall monitor during two consecutive six-month monitoring periods by the date specified in 310 CMR 22.06B(2)(d)5.

b. Any small or medium-size system which installs optimal corrosion control treatment pursuant to 310 CMR 22.06B(2)(e)5. shall monitor during two consecutive six-month monitoring periods by the date specified in 310 CMR 22.06B(2)(e)6.

c. Any system which installs source water treatment pursuant to 310 CMR 22.06B(4)(a)3. shall monitor during two consecutive six-month monitoring periods by the date specified in 310 CMR 22.06B(4)(a)4.

3. Monitoring after Department Specifies Water Quality Parameter Values for Optimal Corrosion Control. After the Department specifies the values for water quality control parameters under 310 CMR 22.06(3)(f), a large water system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the Department specifies the optimal values under 310 CMR 22.06B(3)(f).

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4. Reduced Monitoring.

a. A small or medium-size water system that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the number of samples in accordance with 310 CMR 22.06B(7)(c), and reduce the frequency of lead and copper tap sampling to once per year.

b. Any large water system that meets the lead and copper action levels and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Department under 310 CMR 22.06B(3)(f) during each of two consecutive six-month monitoring periods may reduce the frequency of monitoring for lead and copper to once per calendar year and to reduce the number of lead and copper samples in accordance with 310 CMR 22.06B(7)if it receives permission from the Department. The Department shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with 310 CMR 22.06(B)(11), and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring pursuant to 310 CMR 22.06B(7)(d)4. The Department shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

c. A small or medium-size water system that meets the lead and copper action levels during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years. Any water large system that meets the lead and copper action levels and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Department under 310 CMR 22.06B(3)(f) during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years if it receives written approval from the Department. The Department shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with 310 CMR 22.06B(11) and shall notify the system in writing when it determined the system is eligible to reduce the frequency of monitoring to once every three years. The Department shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

d. A water system that reduces the number and frequency of lead and copper tap sampling shall collect these samples from representative sites included in the pool of targeted sampling sites identified in 310 CMR 22.06B(7)(a). Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August or September unless the Department has approved a different sampling period in accordance with 310 CMR 22.06B(7)(d)4.d.(i).

(i) The Department, at its discretion, may approve a different period for conducting the lead and copper tap sampling for systems collecting a reduced number of samples. Such a period shall be no longer than four consecutive months and shall represent a time of normal operation where the highest levels of lead are most likely to occur. For a non-transient non-community water system that does not operate during the months of June through September, and for which the period of normal operation where the highest levels of lead are most likely to occur is not known, the Department shall designate a period that represents a time of normal operation for the system.

(ii) Systems monitoring annually, that have been collecting samples during the months of June through September and that receive Department approval to alter their sample collection period under 310 CMR 22.06B(7)(d)4.d.(i), shall collect their next round of samples during a time period that ends no later than 21 months after the previous round of sampling. Systems monitoring triennially that have been collecting samples during the months of June through September, and receive Department approval to alter the sampling collection period as per 310 CMR 22.06B(7)(d)4.d.(i), shall collect their next round of samples during a

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time period that ends no later than 45 months after the previous round of sampling. Subsequent rounds of sampling shall be collected annually or triennially, as required by 310 CMR 22.06B(7)(d)4.d.(ii). Small systems with waivers, granted pursuant to 310 CMR 22.06B(7)(g), that have been collecting samples during the months of June through September and choose to alter their sample collection period under 310 CMR 22.06B(7)(d)4.d.(i) shall collect their next round of samples before the end of the nine-year period.

e. Any water system that demonstrates for two consecutive six-month monitoring periods that the tap water lead level computed under 310 CMR 22.06B(1)(c)3. is less than or equal to 0.005 mg/L and the tap water copper level computed under 310 CMR 22.06B(1)(c)3. is less than or equal to 0.65 mg/L may reduce the number of samples in accordance with 310 CMR 22.06B(7)(c) and reduce the frequency of sampling to once every three calendar years.

f. A small or medium-size water system subject to reduced monitoring that exceeds the lead or copper action level shall resume sampling in accordance with 310 CMR 22.06B(7)(c) and collect the number of samples specified for standard monitoring under 310 CMR 22.06B(7)(c). Such system shall also conduct water quality parameter monitoring in accordance with 310 CMR 22.06B(8)(b), (c) or (d) (as appropriate) during the monitoring period in which it exceeded the action level. Any such small or medium system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in 310 CMR 22.06B(7)(c) after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of 310 CMR 22.06B(7)(d)4.a. and/or may resume triennial monitoring for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either 310 CMR 22.06B(7) 310 CMR 22.06B(7)(d)4.c. or e.

g. Any large water system subject to the reduced monitoring frequency that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the Department under 310 CMR 22.06B(8)(f) for more than nine days in any six-month period specified in 310 CMR 22.06B(8)(d) shall conduct tap water sampling for lead and copper at the frequency specified in 310 CMR 22.06B(7)(d)3., collect the number of samples specified for standard monitoring under 310 CMR 22.06B(7)(c), and shall resume monitoring for water quality parameters within the distribution system in accordance with 310 CMR 22.06B(8)(d). Such a system may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

(i) The system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in 310 CMR 22.06B(7)(c)after it has completed two subsequent six-month rounds of monitoring that meet the criteria of 310 CMR 22.06B(7)(d)4.b. and the system has received written approval from the Department that it is appropriate to resume reduced monitoring on an annual frequency.

(ii) The system may resume triennial monitoring for lead and copper at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either 310 CMR 22.06B(7)(d)4.c. or e. and the system has received written approval from the Department that it is appropriate to resume triennial monitoring.

(iii) The system may reduce the number of water quality parameter tap water samples required in accordance with 310 CMR 22.06B(8)(e)1. and the frequency with which it collects such samples in accordance with 310 CMR 22.06B (8)(e)2. Such a system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of 310 CMR 22.06B(8)(e)2., that it has re-qualified for triennial monitoring.

(iv) Any water system subject to a reduced monitoring frequency under 310 CMR 22.06B(7)(d)4. that either adds a new source of water or changes any water treatment shall inform the Department in writing in accordance with 310 CMR 22.06B(11)(a)3. The Department may require the system to resume sampling in accordance with 310 CMR 22.06B(7)(d)3. and collect the number of samples specified for standard monitoring under 310 CMR 22.06B(7)(c) or take other appropriate steps such as increased water quality parameter monitoring or re-evaluation of its corrosion control treatment given the potentially different water quality considerations.

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(e) Additional Monitoring by Systems. The results of any monitoring conducted in addition to the minimum requirements of 310 CMR 22.06B shall be considered by the system and the Department in making any determinations (i.e., calculating the 90th percentile lead or copper level) under 310 CMR 22.06B(7).

(f) Invalidation of Lead or Copper Tap Water Samples. A sample invalidated under 310 CMR 22.06B(7)(f) does not count toward determining lead or copper 90th percentile levels under 310 CMR 22.06B(1)(c)3. or toward meeting the minimum monitoring requirements of 310 CMR 22.06B(7)(c).

1. The Department may invalidate a lead or copper tap water sample at least if one of the following conditions is met.
   a. The laboratory establishes that improper sample analysis caused erroneous results.
   b. The Department determines that the sample was taken from a site that did not meet the site selection criteria of 310 CMR 22.06B(7).
   c. The sample container was damaged in transit.
   d. There is substantial reason to believe that the sample was subject to tampering.
2. The system shall report the results of all samples to the Department and all supporting documentation for samples the system believes should be invalidated.
3. To invalidate a sample under 310 CMR 22.06B(7)(f)1., the decision and the rationale for the decision shall be documented in writing. The Department may not invalidate a sample solely on the grounds that a follow-up sample result is higher or lower than that of the original sample.
4. The water system shall collect replacement samples for any samples invalidated under 310 CMR 22.06B(7) if, after the invalidation of one or more samples, the system has too few samples to meet the minimum requirements of 310 CMR 22.06B(7)(c). Any such replacement samples shall be taken as soon as possible, but no later than 20 days after the date the Department invalidates the sample or by the end of the applicable monitoring period, whichever occurs later. Replacement samples taken after the end of the applicable monitoring period shall not also be used to meet the monitoring requirements of a subsequent monitoring period. The replacement samples shall be taken at the same locations as the invalidated samples or, if that is not possible, at locations other than those already used for sampling during the monitoring period.

(g) Monitoring Waivers for Small Systems. Any small system that meets the criteria of 310 CMR 22.06B(7)(g) may apply to the Department to reduce the frequency of monitoring for lead and copper under 310 CMR 22.06B(7) to once every nine years (i.e., a "full waiver") if it meets all of the materials criteria specified in 310 CMR 22.06B(7)(g)1 and all of the monitoring criteria specified in 310 CMR 22.06B(7)(g)2. If Department regulations permit, any small system that meets the criteria in 310 CMR 22.06B(7)(g)1. and 2. only for lead, or only for copper, may apply to the Department for a waiver to reduce the frequency of tap water monitoring to once every nine years for that contaminant only (i.e., a "partial waiver").

1. Materials Criteria. The system shall demonstrate that its distribution system and service lines and all drinking water supply plumbing, including plumbing conveying drinking water within all residences and buildings connected to the system, are free of lead-containing materials and/or copper-containing materials, as those terms are defined in 310 CMR 22.06(7)(g)1., as follows:
   a. Lead. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for lead (i.e., a "lead waiver"), the water system shall provide certification and supporting documentation to the Department that the system is free of all lead-containing materials, as follows:
      (i) It contains no plastic pipes which contain lead plasticizers, or plastic service lines which contain lead plasticizers; and
      (ii) It is free of lead service lines, lead pipes, lead soldered pipe joints, and leaded brass or bronze alloy fittings and fixtures, unless such fittings and fixtures meet the specifications of any standard established pursuant to 42 U.S.C. 300g-6(e) (SDWA section 1417(e)).
   b. Copper. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for copper (i.e., a "copper waiver"), the water system shall provide certification and supporting documentation to the Department that the system contains no copper pipes or copper service lines.

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2. Monitoring Criteria for Waiver Issuance. The system shall have completed at least one six-month round of standard tap water monitoring for lead and copper at sites approved by the Department and from the number of sites required by 310 CMR 22.07B(7)(c) and demonstrate that the 90th percentile levels for any and all rounds of monitoring conducted since the system became free of all lead-containing and/or copper-containing materials, as appropriate, meet the following criteria.

a. Lead Levels. To qualify for a full waiver, or a lead waiver, the system shall demonstrate that the 90th percentile lead level does not exceed 0.005 mg/L.

b. Copper Levels. To qualify for a full waiver, or a copper waiver, the system shall demonstrate that the 90th percentile copper level does not exceed 0.65 mg/L.

3. Department Approval of Waiver Application. The Department shall notify the system of its waiver determination, in writing, setting forth the basis of its decision and any condition of the waiver. As a condition of the waiver, the Department may require the system to perform specific activities (e.g., limited monitoring, periodic outreach to customers to remind them to avoid installation of materials that might void the waiver) to avoid the risk of lead or copper concentration of concern in tap water. The small system shall continue monitoring for lead and copper at the tap as required by 310 CMR 22.06B(7)(d)1. through 4., as appropriate, until it receives written notification from the Department that the waiver has been approved.

4. Monitoring Frequency for Systems with Waivers.

a. A system with a full waiver shall conduct tap water monitoring for lead and copper in accordance with 310 CMR 22.06B(7)(d)4.d. at the reduced number of sampling sites identified in 310 CMR 22.06B(7)(c) at least once every nine years and provide the materials certification specified in 310 CMR 22.06B(7)(g)1. for both lead and copper to the Department along with the monitoring results.

b. A system with a partial waiver shall conduct tap water monitoring for the waived contaminant in accordance with 310 CMR 22.06B(7)(d)4.d. at the reduced number of sampling sites specified in 310 CMR 22.06B(7)(c) at least once every nine years and provide the materials certification specified in 310 CMR 22.06B(7)(g)1. pertaining to the waived contaminant along with the monitoring results. Such a system also shall continue to monitor for the non-waived contaminant in accordance with requirements of 310 CMR 22.06B(7)(d)1. through 4., as appropriate.

c. If a system with a full or partial waiver adds a new source of water or changes any water treatment, the system shall notify the Department in writing in accordance with 310 CMR 22.06B(11)(a)3. The Department has the authority to require the system to add or modify waiver conditions (e.g., require recertification that the system is free of lead-containing and/or copper-containing materials, require additional round(s) of monitoring), if it deems such modifications are necessary to address treatment or source water changes at the system.

d. If a system with a full or partial waiver becomes aware that it is no longer free of lead-containing or copper-containing materials, as appropriate, (e.g., as a result of new construction or repairs), the system shall notify the Department in writing no later than 60 days after becoming aware of such a change.

5. Continued Eligibility. If the system continues to satisfy the requirements of 310 CMR 22.06B(7)(g)4., the waiver will be renewed automatically, unless any of the conditions listed in 310 CMR 22.06B(7)(g)5.a. through c. occurs. A system whose waiver has been revoked may re-apply for a waiver at such time as it again meets the appropriate materials and monitoring criteria of 310 CMR 22.06B(7)(g)1. and 2.

a. A system with a full waiver or a lead waiver no longer satisfies the materials criteria of 310 CMR 22.06B(7)(g)1.a. or has a 90th percentile lead level greater than 0.005 mg/L.

b. A system with a full waiver or a copper waiver no longer satisfies the materials criteria of 310 CMR 22.06B(7)(g)1.b. or has a 90th percentile copper level greater than 0.65 mg/L.

c. The Department notifies the system, in writing, that the waiver has been revoked, setting forth the basis of its decision.

6. Requirements Following Waiver Revocation. A system whose full or partial waiver has been revoked by the Department is subject to the corrosion control treatment and lead and copper tap water monitoring requirements, as follows:

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a. If the system exceeds the lead and/or copper action level, the system shall implement corrosion control treatment in accordance with the deadlines specified in 310 CMR 22.06B(2)(e), and any other applicable requirements of 310 CMR 2206B(7)(g)6.

b. If the system meets both the lead and the copper action level, the system shall monitor for lead and copper at the tap no less frequently than once every three years using the reduced number of sample sites specified in 310 CMR 22.06B(7)(c).

7. Pre-existing Waivers. Small system waivers approved by the Department in writing prior to April 11, 2000 shall remain in effect under the following conditions:

a. If the system has demonstrated that it is both free of lead-containing and copper-containing materials, as required by 310 CMR 22.06B(7)(g)1. and that its 90th percentile lead levels and 90th percentile copper levels meet the criteria of 310 CMR 22.06B(7)(g)2., the waiver remains in effect so long as the system continues to meet the waiver eligibility criteria of 310 CMR 22.06B(7)(g)5. The first round of tap water monitoring conducted pursuant to 310 CMR 22.06B(7)(g)4. shall be completed no later than nine years after the last time the system has monitored for lead and copper at the tap.

b. If the system has met the materials criteria of 310 CMR 22.06B(7)(g)1. but has not met the monitoring criteria of 310 CMR 22.06B(7)(g)2., the system shall conduct a round of monitoring for lead and copper at the tap demonstrating that it meets the criteria of 310 CMR 22.06B(7)(g)2. no later than September 30, 2000. Thereafter, the waiver shall remain in effect as long as the system meets the continued eligibility criteria of 310 CMR 22.06B(7)(g)5. The first round of tap water monitoring conducted pursuant to 310 CMR 22.06B(7)(g)4. shall be completed no later than nine years after the round of monitoring conducted pursuant to 310 CMR 22.06B(7)(g)2.

(8) Monitoring Requirements for Water Quality Parameters. All large water systems and all small and medium-size systems that exceed the lead or copper action level shall monitor water quality parameters in addition to lead and copper in accordance with 310 CMR 22.06B(8). The requirements of 310 CMR 22.06B(8) are summarized in the table at the end of 310 CMR 22.06B.

(a) General Requirements.

1. Sample Collection Methods.

a. Tap samples shall be representative of water quality throughout the distribution system taking into account the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Tap sampling under 310 CMR 22.06B(8) is not required to be conducted at taps targeted for lead and copper sampling under 310 CMR 22.06B(7)(a). (Note: Systems may find it convenient to conduct tap sampling for water quality parameters at sites used for coliform sampling under 310 CMR 22.05.)

b. Samples collected at the entry point(s) to the distribution system shall be from locations representative of each source after treatment. If a system draws water from more than one source and the sources are combined before distribution, the system shall sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

2. Number of Samples.

a. Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under 310 CMR 22.06B(8)(b) through (e) from the following number of sites.

System Size (No. of People Served)	No. of Sites for Water Quality Parameters
>100,000	25
10,001-100,000	10
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
<100	1

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b. Except as provided in 310 CMR 22.06B(8)(c)3. systems shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in 310 CMR 22.06B(8)(b). During each monitoring period specified in 310 CMR 22.06B(8)(c) through (e), systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system.

(b) Initial Sampling. All large water systems shall measure the applicable water quality parameters as specified below at taps and at each entry point to the distribution system during each six-month monitoring period specified in 310 CMR 22.06B(7)(d)1. All small and medium-size systems shall measure the applicable water quality parameters at the locations specified below during each six-month monitoring period specified in 310 CMR 22.06B(7)(d)1. during which the system exceeds the lead or copper action level.

1. At taps:
   a. pH;
   b. alkalinity;
   c. orthophosphate, when an inhibitor containing a phosphate compound is used;
   d. silica, when an inhibitor containing a silicate compound is used;
   e. calcium;
   f. conductivity; and
   g. water temperature.
2. At each entry point to the distribution system: all of the applicable parameters listed in 310 CMR 22.06B(8)(b)1.

(c) Monitoring after Installation of Corrosion Control. Any large system which installs optimal corrosion control treatment pursuant to 310 CMR 22.06B(2)(d)4. shall measure the water quality parameters at the locations and frequencies specified below during each six-month monitoring period specified in 310 CMR 22.06B(7)(d)2.a. Any small or medium-size system which installs optimal corrosion control treatment shall conduct such monitoring during each six-month monitoring period specified in 310 CMR 22.06B(7)(d)2.b. in which the system exceeds the lead or copper action level.

1. At taps, two samples for:
   a. pH;
   b. alkalinity;
   c. orthophosphate, when an inhibitor containing a phosphate compound is used;
   d. silica, when an inhibitor containing a silicate compound is used;
   e. calcium, when calcium carbonate stabilization is used as part of corrosion control.
2. Except as provided in 310 CMR 22.06B(8)(c)3., at each entry point to the distribution system, one sample every two weeks (bi-weekly) for:
   a. pH;
   b. when alkalinity is adjusted as part of optimal corrosion control, a reading of the dosage rate of the chemical used to adjust alkalinity, and the alkalinity concentration; and
   c. when a corrosion inhibitor is used as part of optimal corrosion control, a reading of the dosage rate of the inhibitor used, and the concentration of orthophosphate or silica (whichever is applicable).
3. Any ground water system can limit entry point sampling described in 310 CMR 22.06B(8)(c)2. to those entry points that are representative of water quality and treatment conditions throughout the system. If water from untreated ground water sources mixes with water from treated ground water sources, the system shall monitor for water quality parameters both at representative entry points receiving treatment and representative entry points receiving no treatment. Prior to the start of any monitoring under 310 CMR 22.06B(8)(c)3., the system shall provide to the Department written information identifying the selected entry points and documentation, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

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(d) Monitoring after Department Specifies Water Quality Parameter Values for Optimal Corrosion Control. After the Department specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment under 310 CMR 22.06B(3)(f) all large systems shall measure the applicable water quality parameters in accordance with 310 CMR 22.06B(8)(c) and determine compliance with the requirements of 310 CMR 22.06B(3)(g) every six months with the first six-month period to begin on the date the Department specifies the optimal values under 310 CMR 22.06B(3)(f). Any small or medium-size system shall conduct such monitoring during each six-month period specified in 310 CMR 22.06B(7)(d)3. in which the system exceeds the lead or copper action level. For any such small and medium-size system that is subject to a reduced monitoring frequency pursuant to 310 CMR 22.06B(7)(d)4. at the time of the action level exceedance, the end of the applicable six-month period under 310 CMR 22.06B(8)(d) shall coincide with the end of the applicable monitoring period under 310 CMR 22.06B(7)(d)4. Compliance with Department-designated optimal water quality parameter values shall be determined as specified under 310 CMR 22.06B(3)(g).

(e) Reduced Monitoring.

1. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment during each of two consecutive six-month monitoring periods under 310 CMR 22.06B(8)(d) shall continue monitoring at the entry point(s) to the distribution system as specified in 310 CMR 22.06B(8)(c)2. Such system may collect two tap samples for applicable water quality parameters from the following reduced number of sites during each six-month monitoring period.

System Size (No. of People Served)	Reduced No. of Sites for Water Quality Parameters
>100,000	10
10,001 to 100,000	7
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
≤100	1

2. a. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Department under 310 CMR 22.06B(3)(f) during three consecutive years of annual monitoring under 310 CMR 22.06B(8)(e)2.a. may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in 310 CMR 22.06B(8)(e)1., from every six months to annually.

b. A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters specified in 310 CMR 22.06B(8)(e)1. to every three years if it demonstrates during two consecutive monitoring periods that its tap water lead level at the 90th percentile is less than or equal to the PQL for lead specified in 310 CMR 22.06B(10)(a)1.b., that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L for copper in 310 CMR 22.06B(1)(c)2., and that it also has maintained the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Department under 310 CMR 22.06B(3)(f).

3. A water system that conducts sampling annually shall collect these samples evenly throughout the year so as to reflect seasonal variability.

4. Any water system subject to the reduced monitoring frequency that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the Department under 310 CMR 22.06B(3)(f) for more than nine days in any six-month period specified in 310 CMR 22.06B(3)(g) shall resume distribution system tap water sampling in accordance with the number and frequency requirements in 310 CMR 22.06B(8)(c). Such a system may resume annual monitoring for water quality parameters at the tap at the reduced number of sites specified in 310 CMR 22.06B(8)(e)1. after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of 310 CMR 22.06B(8)(e)1. and/or may resume triennial monitoring for water quality parameters at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either 310 CMR 22.06B(8)(e)2.a. or b.

22.06B: continued

(f) Additional Monitoring by Systems. The results of any monitoring conducted in addition to the minimum requirements of 310 CMR 22.06B(8) shall be considered by the system and the Department in making any determinations (i.e., determining concentrations of water quality parameters) under 310 CMR 22.06B(8) or 310 CMR 22.06B(3).

(g) For the purposes of determining compliance with 310 CMR 22.06B, samples may be considered only if they have been analyzed by a certified laboratory, except that measurements for alkalinity, calcium, conductivity, orthophosphate, pH, and silicia may be performed by a Massachusetts certified operator.

(9) Monitoring Requirements for Lead and Copper in Source Water.

(a) Sample Location, Collection Methods, and Number of Samples.

1. A water system that fails to meet the lead or copper action level on the basis of tap samples collected in accordance with 310 CMR 22.06B(7) shall collect lead and copper source water samples in accordance with the following requirements regarding sample location, number of samples, and collection methods:

a. Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). The system shall take one sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

b. Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point). The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

NOTE: For the purposes of 310 CMR 22.06B(9)(a)1.b., surface water systems include systems with a combination of surface and ground sources.

c. If a system draws water from more than one source and the sources are combined before distribution, the system shall sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

d. The Department may reduce the total number of samples which shall be analyzed by allowing the use of compositing. Compositing of samples shall be done by certified laboratory personnel. Composite samples from a maximum of five samples are allowed, provided that if the lead concentration in the composite sample is greater than or equal to 0.001 mg/L or the copper concentration is greater than or equal to 0.160 mg/L, then either:

(i) A follow-up sample shall be taken and analyzed within 14 days at each sampling point included in the composite; or

(ii) If duplicates of or sufficient quantities from the original samples from each sampling point used in the composite are available, the system may use these instead of resampling.

2. Where the results of sampling indicate an exceedance of 5ppb, the maximum permissible source water levels established under 310 CMR 22.06B(4)(b)4., the Department may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point. If a Department-required confirmation sample is taken for lead or copper, then the results of the initial and confirmation sample shall be averaged in determining compliance with the Department-specified maximum permissible levels. Any sample value below the detection limit shall be considered to be zero. Any value above the detection limit but below the PQL shall either be considered as the measured value or be considered one-half the PQL.

(b) Monitoring Frequency after System Exceeds Tap Water Action Level. Any system which exceeds the lead or copper action level at the tap shall collect one source water sample from each entry point to the distribution system within six months after the exceedance.

(c) Monitoring Frequency after Installation of Source Water Treatment. Any system which installs source water treatment pursuant to 310 CMR 22.06B(4)(a)3. shall collect an additional source water sample from each entry point to the distribution system during two consecutive six-month monitoring periods by the deadline specified in 310 CMR 22.06B(4)(a)4.

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(d) Monitoring Frequency after the Department Determines that Source Water Treatment is not Needed.

1. A system shall monitor at the frequency specified below in cases where the Department determines that the system is not required to install source water treatment under 310 CMR 22.06B(4)(b)2.

a. A water system using only groundwater shall collect samples once during the three-year compliance period (as that term is defined in 310 CMR 22.02) in effect when the applicable Department determination under 310 CMR 22.06B(9)(d)1. is made. Such systems shall collect samples once during each subsequent compliance period.

b. A water system using surface water (or a combination of surface and groundwater) shall collect samples once during each year, the first annual monitoring period to begin on the date on which the applicable Department determination is made under 310 CMR 22.06B(9)(d)1.

2. A system is not required to conduct source water sampling for lead and/or copper if the system meets the action level for the specific contaminant in tap water samples during the entire source water sampling period applicable to the system under 310 CMR 22.06B(9)(d)1.a. or b.

(e) Reduced Monitoring Frequency.

1. A water system using only ground water may reduce the monitoring frequency for lead and/or copper in source water to once during each nine-year compliance cycle (as that term is defined in 310 CMR 22.02)if the system meets one of the following criteria:

a. The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Department in 310 CMR 22.06B(4)(b)4. during at least three consecutive compliance periods under 310 CMR 22.06B(9)(d)1.; or

b. The Department has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive compliance periods in which sampling was conducted under 310 CMR 22.06B(9)(d)1., the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

2. A water system using surface water (or a combination of surface and ground waters) may reduce the monitoring frequency in 310 CMR 22.06B(9)(d)1. to once during each nine-year compliance cycle (as that term is defined in 310 CMR 22.06(4). if the system meets one of the following criteria:

a. The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Department in 310 CMR 22.06B(4)(b)4. for at least three consecutive calendar years; or

b. The Department has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive calendar years, the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

3. A water system that uses a new source of water is not eligible for reduced monitoring for lead and/or copper until concentrations in samples collected from the new source during three consecutive monitoring periods are below the maximum permissible lead and copper concentrations specified by the Department in 310 CMR 22.06B(4)(a)5.

(10) Analytical Methods.

(a) Analyses for lead, copper, pH, conductivity, calcium, alkalinity, orthophosphate, silica, and temperature shall be conducted using the following methods:

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ANALYTICAL METHODS

Contaminant	Methodology[9]	Reference (Method Number) EPA[1]	ASTM[2]	SM[3]	USGS[4]	Other
Lead	Atomic absorption; furnace technique	----	D3559-96D	3113B		
	Inductively-coupled plasma; mass spectrometry	200.8				
	Atomic absorption; platform furnace technique	200.9				
	Differential Pulse Anodic Stripping Voltameter					Method 1001[10]
Copper	Atomic absorption; furnace technique	----	D1688-95C	3113B		
	Atomic absorption; direct aspiration	----	D1688-95A	3111-B		
	Inductively-coupled plasma	200.7[5]		3120B		
	Inductively-coupled plasma; mass spectrometry	200.8[6]				
	Atomic absorption; platform furnace	200.9[7]				
pH	Electrometric	150.1 150.2	D1293-95	4500-H^+B		
Conductivity	Conductance	----	D1125-95A	2510B		
Calcium	EDTA titrimetric	----	D511-93A	3500-Ca-D		
	Atomic absorption; direct aspiration		D511-93B	3111B		
	Inductively-coupled plasma	200.7		3120B		
Alkalinity	Titrimetric	----	D1067-92B	2320B		
	Electrometric titration				I-1030-85	
Ortho-phosphate, unfiltered, no digestion or hydrolysis	Colorimetric, automated, ascorbic acid	365.1[8]		4500-P-F		
	Colorimetric, ascorbic acid, two reagent	----				
	Colorimetric, ascorbic acid, single reagent	----	D515-88A	4500-P-E		
	Colorimetric, phosphomolybdate; automated-segmented flow; automated discrete				I-1601-85 I-2601-90 I-2598-85	
	Ion Chromatography	300.0[8]	D4327-97	4110B		
Silica	Colorimetric, molybdate blue; automated-segmented flow				I-1700-85 I-2700-85	
	Colorimetric	----	D859-95			
	Molybdosilicate			4500-Si-D (18^{th}, 19^{th} ed.) 4500-SiO_2 C (20^{th} ed.)		
	Heteropoly blue			4500-Si-E (18^{th}, 19^{th} ed.) 4500-SiO_2 D (20^{th} ed.)		
	Automated method for molybdate-reactive silica			4500-Si-F (18^{th}, 19^{th} ed.) 4500-SiO_2 E (20^{th} ed.)		
	Inductively-coupled plasma	200.7[5]		3120B		
Temperature	Thermometric			2550		

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ANALYTICAL METHODS (continued)

[1] The procedures 239.2, 220.2, 220.1, 150.1, 150.2, 120.1, 215.2, 310.1, 365.1, 365.3, 365.2, and 370.1 are incorporated by reference and shall be done in accordance with "Methods for Chemical Analysis of Water and Wastes," EPA Environmental Monitoring and Support Laboratory, Cincinnati, OH (EPA-600/4-79-020), Revised March 1983, pp. 239.2-1 through 239.2-2 and metals-1 through metals-19, 220.2-1 through 220.2-2 and metals-1 through metals-19, 220.1-1 through 220.1-2 and metals-1 through metals-19, 150.1-1 through 150.1-3, 150.2-1 through 150.2-3, 120.1-1 through 120.1-3, 215.2-1 through 215.2-3, 215.1-1 through 215.1-2, 310.1-1 through 310.1-3, 365.1-1 through 365.1-9, 365.3-1 through 365.3-4, 365.2-1 through 365.2-6, and 370.1-1 through 370.1-5, respectively. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies may be obtained from ORD Publications, CERI, EPA, Cincinnati, OH 45268. Copies may be inspected at the United Departments Environmental Protection Agency, 401 M Street, SW., Room EB-15, Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, D.C.

[2]The procedures D3559-96D, D1688-95C, D1688-95A, D1293-95B, D1125-82B, D511-88A, D511-88B, D1067-88B, D515-88A, D4327-97, and D859-88 are incorporated by reference and shall be done in accordance with *Annual Book of ASTM Standards*, 1994, 1996, or 1999, Vols. 11.01 and 11.02, ASTM International; any year containing the cited version of the method may be used. The previous versions of D1688-95A, D1688-95C (copper), D3559-95D (lead), D1293-95 (pH), D1125-91A (conductivity), and D859-94 (silica) are also approved. These previous versions D1688-90A, C; D355990D, D1293-84, D1125-91A and D859-88, respectively are located in the *Annual Book of ASTM Standards*, 1994, Vol. 11.01. Copies may be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

[3] The procedures 3113, 3111-B, 3120, 4500-H^+, 2510, 3500-Ca-D, 3120, 2320, 4500-P-F, 4500-P-E, 4110, 4500-Si-D, 4500-Si-E, 4500-Si-F, and 2550 are incorporated by reference and shall be done in accordance with *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995) or 20th edition (1998), American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005. The cited methods published in any of these three editions may be used, except that the versions of 3111B and 3113B in the 20th edition may not be used. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies may be obtained from the American Water Works Association, Customer Services, 6666 West Quincy Avenue, Denver, Co 80235, Phone (303) 794-7711. Copies may be inspected at the United Departments Environmental Protection Agency, 401 M Street, SW., Room EB-15, Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, D.C.

[4] The procedures I-1030-85, I-1601-85, I-2601-85, I-2598-85, I-1700-85, and I-2700-85 are incorporated by reference and shall be done in accordance with "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," 3rd edition, U.S. Department of Interior , U.S. Geological Survey, 1989, pp. 55-56, 381-382, 383-385, 387-388, 415-416, and 417-419, respectively. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies may be purchased from the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, Co 80225. Copies may be inspected at the United Departments Environmental Protection Agency, 401 M Street, SW., Room EB-15, Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, D.C.

[5]"Determination of Metals and Trace Elements in Water and Wastes by Inductively-Coupled Plasma--Atomic Emission Spectrometry," Revision 3.3, April 1991, "Methods for the Determination of Metals in Environmental Samples," Office of Research and Development, Washington, DC 20460, EPA/4-91/010, June 1991.

[6]"Determination of Trace Elements in Water and Wastes by Inductively-Coupled Plasma--Mass Spectrometry," Revision 4.4, April 1991, "Methods for the Determination of Metals in Environmental Samples," Office of Research and Development, Washington, DC 20460, EPA/600/4-91/010, June, 1991.

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ANALYTICAL METHODS (continued)

[7]"Determination of Trace Elements by Stabilized Temperature Graphite Furnace Atomic Absorption Spectrometry, Revision 1.2, April 1991, "Methods for the Determination of Metals in Environmental Samples," Office of Research and Development, Washington, DC 20460, EPA/600/4-91/010, June 1991.
[8]"Determination of Inorganic Ions in Water by Ion Chromatography," Method 300.0, December 1989, U.S. EPA EMSL. This document is available from U.S. EPA, EMSL, Cincinnati, OH 45268.
[9]For analyzing lead and copper, the technique applicable to total metals shall be used and samples cannot be filtered. Samples that contain less than 1 NTU (nephelometric turbidity unit) and are properly preserved (conc HNO^3 TO pH <2) may be analyzed directly (without digestion) for total metals: otherwise, digestion is required. Turbidity shall be measured on the preserved samples just prior to when metals analysis is initiated. When digestion is required, the "total recoverable" technique as defined in the method shall be used.
[10]The description for Method 1001 for lead is available from Palintest, LTD, 21 Kenton Lands Road, P.O. Box 18395, Erlanger, KY 41018. Or from the Hach Company, P.O. Box 389, Loveland, CO 80539.

1. Analyses under 310 CMR 22.06B(9) shall only be conducted by laboratories that have been certified by EPA or the Department as stated in 310 CMR 22.11A. To obtain certification to conduct analyses for lead and copper, laboratories shall:
   a. Analyze performance evaluation samples which include lead and copper provided by a laboratory certified by the National Institute of Standards and Technology (NIST); and
   b. quantitative acceptance limits as follows:
      (i) Lead: ±30% of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.005 mg/L. The Practical Quantitation Level, or PQL, for lead is 0.005 mg/L.
      (ii) Copper: ±10% of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.050 mg/L. The Practical Quantitation Level, or PQL, for copper is 0.05 mg/L.
   c. If the laboratory will be process source water composite samples under 310 CMR 22.06B(9)(a)1.c., achieve method detection limits for lead of 0.001 mg/L according to the procedures in Appendix B of Part 136 of 40 CFR.
   d. Be currently certified by EPA or the Department to perform analyses to the specifications described in 310 CMR 22.06B(10)(a)2.
2. The Department has the authority to allow the use of previously collected monitoring data for purposes of monitoring, if the data were collected an analyzed in accordance with the requirements of 310 CMR 22.06B(a).
3. All lead levels measured between the PQL and the MDL shall be either reported as measured or they can be reported as one-half the PQL (0.0025 mg/L). All levels below the lead MDL shall be reported as zero.
4. All copper levels measured between the PQL and the MDL shall be either reported as measured or they can be reported as one-half the PQL (0.025 mg/L). All levels below the copper MDL shall be reported as zero.

(11) Reporting Requirements. All water systems shall report all of the following information to the Department in accordance with 310 CMR 22.06B(11).
   (a) Reporting requirements for tap water monitoring for lead and copper and for water quality parameter monitoring
      1. Except as provided in 310 CMR 22.06B(11)(a)1.h., a water system shall report the information specified below for all tap water samples specified in 310 CMR 22.06B(7) and for all water quality parameter samples specified in 310 CMR 22.06B(8) within the first ten days following the end of each applicable monitoring period specified in 310 CMR 22.06B(7) and (8) (i.e., every six-months, annually, every three years, or every nine years):
         a. The results of all tap samples for lead and copper including the location of each site and the criteria under 310 CMR 22.06B(7)(a)3., 4., 5., 6., and/or 7. under which the site was selected for the system's sampling pool;
         b. Documentation for each sample tap water lead or copper sample for which the water system requests invalidation pursuant to 310 CMR 22.06B(7)(f)2.;

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c. the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period (calculated in accordance with 310 CMR 22.06B(11)(c)3. Unless the Department calculates the systems 90th percentile lead and copper levels under 310 CMR 22.06B(11)(h);

d. with the exception of initial tap sampling conducted pursuant to 310 CMR 22.06B(7)(d)1., the system shall designate any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed;

e. the results of all tap samples for pH, and where applicable, alkalinity, calcium, conductivity, temperature, and orthophosphate or silica collected under 310 CMR 22.06B(8)(b) through (e);

f. the results of all samples collected at the entry point(s) to the distribution system for applicable water quality parameters under 310 CMR 22.06B(8)(b) through (e).

g. A water system shall report the results of all water quality parameter samples collected under 310 CMR 22.06B(8)(c) through (f) during each six-month monitoring period specified in 310 CMR 22.06B(8)(d) within the first ten days following the end of the monitoring period unless the Department has specified a more frequent reporting requirement.

2. For a non-transient non-community water system, or a community water system meeting the criteria of 310 CMR 22.06B(6)(c)7.a. and b., that does not have enough taps that can provide first-draw samples, the system shall either:

a. Provide written documentation to the Department identifying standing times and locations for enough non-first-draw samples to make up its sampling pool under 310 CMR 22.06B(7)(b)(5) by the start of the first applicable monitoring period under 310 CMR 22.06B(7)(d) that commences after April 11, 2000, unless the Department has waived prior Department approval of non-first-draw sample sites selected by the system pursuant to 310 CMR 22.06B(7)(b)5.; or

b. If the Department has waived prior approval of non-first-draw sample sites selected by the system, identify, in writing, each site that did not meet the six-hour minimum standing time and the length of standing time for that particular substitute sample collected pursuant to 310 CMR 22.06B(7)(b)5. and include this information with the lead and copper tap sample results required to be submitted pursuant to 310 CMR 22.07B(11)(a)1.a.

3. No later than 60 days after the addition of a new source or any change in water treatment, unless the Department requires earlier notification, a water system deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b)3., a water system subject to reduced monitoring pursuant to 310 CMR 22.06B(7)(d)4., or a water system subject to a monitoring waiver pursuant to 310 CMR 22.06B(7)(g), shall send written documentation to the Department describing the change. In those instances where prior Department approval of the treatment change or new source is not required, water systems are encouraged to provide the notification to the Department beforehand to minimize the risk the treatment change or new source will adversely affect optimal corrosion control.

4. Any small system applying for a monitoring waiver under 310 CMR 22.06B(7)(g), or subject to a waiver granted pursuant to 310 CMR 22.06B(7)(g)3., shall provide the following information to the Department in writing by the specified deadline:

a. By the start of the first applicable monitoring period in 310 CMR 22.06B(7)(d), any small water system applying for a monitoring waiver shall provide the documentation required to demonstrate that it meets the waiver criteria of 310 CMR 22.06B(7)(g)1. and 2.

b. No later than nine years after the monitoring previously conducted pursuant to 310 CMR 22.06B(7)(g)2. or 310 CMR 22.06B(7)(g)4.a., each small system desiring to maintain its monitoring waiver shall provide the information required by 310 CMR 22.06B(7)(g)4.a. and b.

c. No later than 60 days after it becomes aware that it is no longer free of lead-containing and/or copper-containing material, as appropriate, each small system with a monitoring waiver shall provide written notification to the Department, setting forth the circumstances resulting in the lead-containing and/or copper-containing materials being introduced into the system and what corrective action, if any, the system plans to remove these materials.

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d. By October 10, 2000, any small system with a waiver granted prior to April 11, 2000 and that has not previously met the requirements of 310 CMR 22.06B(7)(g)2. shall provide the information required by 310 CMR 22.06B(7)(g)2.

5. Each ground water system that limits water quality parameter monitoring to a subset of entry points under 310 CMR 22.06B(8)(c)3. shall provide, by the commencement of such monitoring, written correspondence to the Department that identifies the selected entry points and includes information sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

(b) Source Water Monitoring Reporting Requirements.

1. A water system shall report the sampling results for all source water samples collected in accordance with 310 CMR 22.06B(9), within the first ten days following the end of each source water monitoring period (i.e., annually, per compliance period, per compliance cycle) specified in 310 CMR 22.06B(9).

2. With the exception of the first round of source water sampling conducted pursuant to 310 CMR 22.06B(9)(b), the system shall specify any site which was not sampled during previous monitoring periods, and include an explanation of why the sampling point has changed.

(c) Corrosion Control Treatment Reporting Requirements. By the applicable dates under 310 CMR 22.06B(2), systems shall report the following information:

1. for systems demonstrating that they have already optimized corrosion control, information required in 310 CMR 22.06B(2)(b)2. or 3.

2. for systems required to optimize corrosion control, their recommendation regarding optimal corrosion control treatment under 310 CMR 22.06B(3)(a).

3. for systems required to evaluate the effectiveness of corrosion control treatments under 310 CMR 22.06B(3)(c) the information required by 310 CMR 22.06B(3)(c).

4. for systems required to install optimal corrosion control designated by the Department under 310 CMR 22.06B(3)(d), a letter certifying that the system has completed installing that treatment.

(d) Source Water Treatment Rreporting Requirements. By the applicable dates in 310 CMR 22.06B(4), systems shall provide the following information to the Department:

1. if required under 310 CMR 22.06B(4)(b)1., their recommendation regarding source water treatment;

2. for systems required to install source water treatment under 310 CMR 22.06B(4)(b)2., a letter certifying that the system has completed installing the treatment designated by the Department within 24 months after the Department designated the treatment.

(e) Lead Service Line Replacement Reporting Requirements. Systems shall report the following information to the Department to demonstrate compliance with the requirements of 310 CMR 22.06B(5):

1. Within 12 months after a system exceeds the lead action level in sampling referred to in 310 CMR 22.06B(5)(a), the system shall demonstrate in writing to the Department that it has conducted a materials evaluation, including the evaluation in 310 CMR 22.06B(7)(a), to identify the initial number of lead service lines in its distribution system, and shall provide the Department with the system's schedule for replacing annually at least 7% of the initial number of lead service lines in its distribution system.

2. Within 12 months after a system exceeds the lead action level in sampling referred to in 310 CMR 22.06B(5)(a), and every 12 months thereafter, the system shall demonstrate to the Department in writing that the system has either:

a. replaced in the previous 12 months at least 7% of the initial lead service lines (or a greater number of lines specified by the Department under 310 CMR 22.06B(5)(f) in its distribution system, or

b. conducted sampling which demonstrates that the lead concentration in all service line samples from an individual line(s), taken pursuant to 310 CMR 22.06B(7)(b)3., is less than or equal to 0.015 mg/L. In such cases, the total number of lines replaced and/or which meet the criteria in 310 CMR 22.O6B(5)(c) shall equal at least 7% of the initial number of lead lines identified under 310 CMR 22.06B(11)(a) (or the percentage specified by the Department under 310 CMR 22.06B(5)(f).

3. The annual letter submitted to the Department under 310 CMR 22.06B(11)(e)2. shall contain the following information:

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a. the number of lead service lines scheduled to be replaced during the previous year of the system's replacement schedule;

b. the number and location of each lead service line replaced during the previous year of the system's replacement schedule;

c. if measured, the water lead concentration and location of each lead service line sampled, the sampling method, and the date of sampling.

4. Any system which collects lead service line samples following partial lead service line replacement required by 310 CMR 22.06B(5) shall report the results to the Department within the first ten days of the month following the month in which the system receives the laboratory results, or as specified by the Department. The Department, at its discretion may eliminate this requirement to report these monitoring results. Systems shall also report any additional information as specified by the Department, and in a time and manner prescribed by the Department, to verify that all partial lead service line replacement activities have taken place.

(f) Public Education Program Reporting Requirements.

1. Any water system that is subject to the public education requirements in 310 CMR 22.06B(6) shall, within ten days after the end of each period in which the system is required to perform public education tasks in accordance with 310 CMR 22.06B(6)(c), send written documentation to the Department that contains:

a. A demonstration that the system has delivered the public education materials that meet the content requirements in 310 CMR 22.06B(6)(a) and (b) and the delivery requirements in 310 CMR 22.06B(6)(c); and

b. A list of all the newspapers, radio stations, television stations, and facilities and organizations to which the system delivered public education materials during the period in which the system was required to perform public education tasks.

2. Unless required by the Department, a system that previously has submitted the information required by 310 CMR 22.06B(11)(f)1.b. need not resubmit the information required by 310 CMR 22.06B(11)(f)1.b., as long as there have been no changes in the distribution list and the system certifies that the public education materials were distributed to the same list submitted previously.

(g) Reporting of Additional Monitoring Data. Any system which collects sampling data in addition to that required by this subpart shall report the results to the Department within the first ten days following the end of the applicable monitoring period under 310 CMR 22.06B(7), (8), and (9) during which the samples are collected.

(h) Reporting of 90th percentile lead and copper concentrations where the Department calculates a system's 90th percentile concentrations. A water system is not required to report the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period, as required by 310 CMR 22.06B(11)(a)1.d. if:

1. The Department has previously notified the water system that it will calculate the water system's 90th percentile lead and copper concentrations, based on the lead and copper tap results submitted pursuant to 310 CMR 22.06B(h)2.a., and has specified a date before the end of the applicable monitoring period by which the system shall provide the results of lead and copper tap water samples;

2. The system has provided the following information to the Department by the date specified in 310 CMR 22.06B(11)(h)1.:

a. The results of all tap samples for lead and copper including the location of each site and the criteria under 310 CMR 22.06B(7)(a)3., 4., 5., 6., and/or 7. under which the site was selected for the system's sampling pool, pursuant to 310 CMR 22.06B(11)(a)1.a.; and

b. An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation why sampling sites have changed; and

3. The Department has provided the results of the 90th percentile lead and copper calculations, in writing, to the water system before the end of the monitoring period.

(12) Recordkeeping Requirements. Any system subject to the requirements of 310 CMR 22.06B shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, Department determinations, and any other information required by 310 CMR 22.06B(2) through 310 CMR 22.06B(9). Each water system shall retain the records required by 310 CMR 22.06B for no fewer than 12 years.

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Summary of Monitoring Requirements for Water Quality Parameters[1]

Monitoring Period	Parameters[2]	Location	Frequency
Initial Monitoring.	pH, alkalinity, orthophosphate or silica[3], calcium, conductivity, temperature.	Taps and at entry point(s) to distribution system.	Two samples every six months.
After Installation of Corrosion Control.	pH, alkalinity, orthophosphate or silica[3], calcium[4].	Taps.	Two samples every six months.
	pH, alkalinity, dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5].	Entry point(s) to distribution system[6].	No less frequently than every two weeks.
After State Specifies Parameter Values for Optimal Corrosion Control.	pH, alkalinity, orthophosphate or silica[3], calcium[4].	Taps.	Two Samples every six months.
	pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5]	Entry point(s) to distribution system[6].	No less frequently than every two weeks.
Reduced Monitoring.	pH, alkalinity, orthophosphate or silica[3], calcium[4].	Taps.	Two samples every six months, annually[7] or every three years[8]; reduced number of sites.
	pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5].	Entry point(s) to distribution system[6].	No less frequently than every two weeks.

[1]Table is for illustrative purposes; consult the text of 310 CMR 22.06B(12) for precise regulatory requirements.

[2]Small and medium-size systems have to monitor for water quality parameters only during monitoring periods in which the system exceeds the lead or copper action level.

[3]Orthophosphate shall be measured only when an inhibitor containing a phosphate compound is used. Silica shall be measured only when an inhibitor containing silicate compound is used.

[4]Calcium shall be measured only when calcium carbonate stabilization is used as part of corrosion control.

[5]Inhibitor dosage rates and inhibitor residual concentrations (orthophosphate or silica) shall be measured only when an inhibitor is used.

[6]Ground water systems may limit monitoring to representative locations throughout the system.

[7]Water systems may reduce frequency of monitoring for water quality parameters at the tap from every six months to annually if they have maintained the range of values for water quality parameters reflecting optimal corrosion control during three consecutive years of monitoring.

[8]Water systems may further reduce the frequency of monitoring for water quality parameters at the tap from annually to once every three years if they have maintained the range of values for water quality parameters reflecting optimal corrosion control during three consecutive years of annual monitoring. Water systems may accelerate to triennial monitoring for water quality parameters at the tap if they have maintained 90th percentile lead levels less than or equal to 0.005 mg/L, 90th percentile copper levels less than or equal to 0.65 mg/L, and the range of water quality parameters designated by the State under §141.82(f) as representing optimal corrosion control during two consecutive six-month monitoring periods.

22.06C: Compliance with Secondary Maximum Contaminant Level and Public Notification for Fluoride

Community water systems sampling pursuant to 310 CMR 22.06 which exceed the secondary maximum contaminant level for fluoride, but do not exceed the maximum contaminant level for fluoride, shall comply with 310 CMR 22.16(4).

Secondary Maximum Contaminant Level for Fluoride - 2.0 mg/l

22.06D: Special Monitoring for Perchlorate

(1) Applicability. Monitoring under 310 CMR 22.06(D) applies to community water systems and non-transient non-community water systems.

(2) Sampling Protocol. Monitoring shall be as follows:

(a) Groundwater Sampling Points. Groundwater systems shall take one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point) during the month of April 2004 and again during the month of September 2004. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(b) Surface Water Sampling Points. Surface water systems *(Note:* For the purposes of 310 CMR 22.06D(2)(b), surface water systems include systems with a combination of surface and ground sources.) shall take one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point) beginning in March 2004 and continuing in each calendar quarter (April to June, July to September, and October to December) until December 31,2004. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(c) Multiple Sources. If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions *(i.e.* when water is representative of all sources being used).

(3) Increased Sampling Frequency. The Department may require more frequent monitoring than specified in 310 CMR 22.06D(2) or may require confirmation samples for positive or negative results at its discretion.

(4) Analytical Methods for Perchlorate. Analysis for perchlorate shall be conducted using EP A Method 314.0, revision 1.0, November 1999, "Determination of Perchlorate in Drinking Water U sing Ion Chromatography" as modified to achieve the performance requirements in 310 CMR 22.06D(4).

Perchlorate Detection Limits. Analysis for perchlorate must meet a minimum reporting level of 1.0 ug/L (ppb) with a method detection limit below this level.

(5) Use of Certified Laboratories. Analysis for perchlorate shall be conducted by a laboratory approved by EP A for monitoring perchlorate under the Unregulated Contaminant Monitoring Rule (40 CFR 141.35) provided that the laboratory has demonstrated to the Department that it can achieve the more stringent performance requirements of 310 CMR 22.060(4). The full. list of laboratories approved by EP A for UCMR perchlorate monitoring can be found at http:/ /www .epa.gov/safewater/standard/ucmr/aprvlabs.html#percanchor. The Department will make available at http://www .state.ma.us/dep/brp/dws/dwsforms.htm#quality a list of the laboratories which have demonstrated the more stringent detection limits. ,

(6) Reporting. Each supplier of water who is required to monitoring under 310 CMR 22.06D shall report to the Department according to the provisions of 310 CMR 22.15.

22.07: Maximum Trihalomethanes Contaminant Levels, Monitoring Requirements and Analytical Method

(1) MCLs for Trihalomethanes Chemicals: The maximum contaminant level for total trihalomethanes of 310 CMR 22.07 applies only to community water systems which serve a population of 10,000 or more individuals and which add a disinfectant (oxidant) to the water in any part of the drinking water treatment process. For systems using surface water or ground water under the direct influence of surface water, the MCL and monitoring requirements of 310 CMR 22.07 will be superceded by those described within 310 CMR 22.07E after December 31, 2001. For systems only using ground water not under the direct influence of surface water, the MCL and monitoring requirements of 310 CMR 22.07 will be superceded by those described within 310 CMR 22.07E after December 31, 2003. After December 31, 2003, 310 CMR 22.07 will no longer be applicable. Compliance with the maximum contaminant level for total trihalomethanes is calculated pursuant to 310 CMR 22.07(2).

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Contaminant
Total trihalomethanes are the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform). Level (mg/l)
The maximum contaminant level for total trihalomethanes - 0.10 milligrams per liter.

(2) Total Thihalomethanes Sampling, Analytical and Other Requirements:

(a) Community water systems that serve a population of 10,000 or more individuals and add a disinfectant (oxidant) to drinking water in any part of the treatment process shall sample and analyze for total trihalomethanes in accordance with 310 CMR 22.07(2)(a). Community water systems that serve a population of 75,000 or more individuals shall begin sampling and analyses for total trihalomethanes by November 29, 1980. Community water systems that serve a population of 10,000 to 74,999 individuals shall begin sampling and analyses for total trihalomethanes by November 29, 1982. Compliance with the maximum contaminant level for total trihalomethanes shall be determined on the basis of the running annual average of quarterly analytic results. If the average of sampling results covering any 12 month period exceeds the maximum contaminant level, the supplier of water shall: (1) report to the Department in accordance with 310 CMR 22.15; and (2) notify the public of the exceedance in accordance with 310 CMR 22.16. Monitoring after an exceedance shall be at a frequency prescribed by the Department until a monitoring schedule as a condition to a variance, exemption or enforcement action becomes effective.

(b) For all community water systems utilizing surface water sources in whole or in any part, and for all community water systems utilizing only ground water sources that have not been determined by the Department to qualify for the reduced monitoring requirements of 310 CMR 22.07(2)(d), analyses for total trihalomethanes shall be performed at quarterly intervals on at least four water samples for each treatment plant used by the community water system. All of the samples taken per quarter shall be collected within a 24-hour period. At least 25% of the samples shall be taken at locations within the distribution system reflecting the maximum residence time of the water in the system. The remaining 75% shall be taken at representative locations in the distribution system, taking into account the number of persons served, the different sources of water and the different treatment methods employed. The results of all analyses per quarter shall be arithmetically averaged and reported to the Department within 30 days of the system's receipt of such results. All samples collected shall be used in the computation of the average, unless the analytical results are invalidated for technical reasons, in which case the results thus invalidated and an explanation of why the results were invalidated shall be included in the report required herein. The Department reserves the right to require results invalidated by the supplier of water to be included in the computation of the average whenever the Department deems such action necessary or appropriate to protect the public health.

NON-TEXT PAGE

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(c) Upon the written request of a community water system subject to 310 CMR 22.07(2)(b), the monitoring frequency required by 310 CMR 22.07(2)(b) may be reduced by express written permission of the Department to one sample analyzed for total trihalomethanes per quarter taken at a point in the distribution system reflecting the maximum residence time of the water in the system, upon a written determination by the Department that the data from at least one year of monitoring in accordance with 310 CMR 22.07(2)(b) and local conditions demonstrate that total trihalomethane concentrations will be consistently below the maximum contaminant level. If at any time during which a community water system is subject to 310 CMR 22.07(2)(c), the results from any analysis exceed 0.10 milligrams of total trihalomethanes per liter of water and such results are confirmed by at least one check sample taken promptly after such results are received, or if no such check sample is promptly taken, or if the community water system makes any significant change to its source of water or treatment, the community water system shall immediately become subject to 310 CMR 22.07(2)(b) and for at least one year thereafter shall not be eligible for permission to become subject to 310 CMR 22.07(2)(c). The Department reserves the right to order a community water system to increase the monitoring frequency above the minimum prescribed in 310 CMR 22.07(2)(c) whenever the Department deems such action necessary to detect variations of total trihalomethane levels within the distribution system. All the samples thus taken shall be collected within a 24 hour period.

(d) Upon written request of a community water system which would otherwise be subject to 310 CMR 22.07(2)(b) and which utilizes only ground water sources, the monitoring frequency required by 310 CMR 22.07(2)(b) may be reduced by express written permission of the Department to one sample analyzed for maximum total trihalomethane potential per year for each treatment plant used by the community water system, which samples shall be taken at a point in the distribution system reflecting the maximum residence time of the water in the system. The Department may grant such permission only upon express written determination that, based upon the data submitted by the supplier of water, the community water system has a maximum total trihalomethane potential of less than 0.10 milligrams per liter and that, based upon an assessment of the local conditions of the system, the community water system is not likely to approach or exceed the maximum contaminant level for total trihalomethanes. If at any time during which a community water system is subject to 310 CMR 22.07(2)(d) the results from any analysis taken for maximum total trihalomethane potential are equal to or greater than 0.10 milligrams per liter, and such results are confirmed by at least one check sample taken promptly after such results are received, or if no such check sample is promptly taken, the community water system shall immediately become subject to 310 CMR 22.07(2)(b) and for at least one year thereafter shall not be eligible for permission to become subject to 310 CMR 22.07(2)(c) or (d). In the event of any significant change to the community water system's raw water or treatment program, the community water system shall immediately analyze an additional sample for maximum total trihalomethane potential taken at a point in the distribution system reflecting maximum residence time of the water in the system for the purpose of determining whether the community water system must become subject to 310 CMR 22.07(2)(b). The results of all analyses pursuant to 310 CMR 22.07(2)(d) shall be reported to the Department within 30 days of the community water system's receipt of such results. All samples collected pursuant to 310 CMR 22.07(2)(d) shall be used for determining whether the community water system is to be made subject to 310 CMR 22.07(2)(b), unless the analytical results are invalidated for technical reasons, in which case the results thus invalidated and an explanation of why the results were invalidated shall be included in the report required herein. The Department reserves the right to require the results invalidated by the supplier of water to be included in determining whether the community water system is to be made subject to 310 CMR 22.07(2)(b) whenever the Department deems such action necessary or appropriate to protect the public health. The Department reserves the right to order a community water system to increase the monitoring frequency above the minimum prescribed in 310 CMR 22.07(2)(d) whenever the Department deems such action necessary to detect variations of total trihalomethane levels within the distribution system. All of the samples thus taken shall be collected within a 24 hour period.

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(e) The minimum number of samples required to be taken by a community water system pursuant to 310 CMR 22.07(b), (c), or (d) shall be based on the number of treatment plants used by the community water system, except that multiple wells drawing raw water from a single aquifer may, with the express written permission of the Department, be considered one treatment plant for determining the minimum number of samples required.

(f) Sampling and analyses made pursuant to 310 CMR 22.07 shall be conducted by one of the methods listed in 310 CMR 22.07(2)(f)1. through (f)4. or those approved by EPA.:

1. Reserved.

2. "VOCs by Purge and Trap Capillary GC with Photoionization and Electrolytic Conductivity Detectors in Series," Method 502.2. EPA Method 502.2 is contained in *Methods for the Determination of Organic Compounds in Drinking Water-Supplement III*, USEPA, August 1995, EPA/600/R-95/131 (available through the National Technical Information Service (NTIS), PB95- 261616). Earlier versions of this method ceased to be approved as of June 1, 2001.

3. Purgeable Organic Compounds by Capillary Column GC/Mass Spectrometry," Method 524.2. EPA Method 524.2 is contained in *Methods for the Determination of Organic Compounds in Drinking Water-Supplement III*, USEPA, August 1995, EPA/600/R-95/131 (available through the NTIS, PB95- 261616). Earlier versions of this method ceased to be approved as of June 1, 2001.

4. Chlorinated Disinfection By-Products and Chlorinated Solvents by Liquid-Liquid Extraction and GC with an Electron Capture Detector," Method 551.1. EPA Method 551.1 is contained in *Methods for the Determination of Organic Compounds in Drinking Water-Supplement III*, USEPA, August 1995, EPA/600/R-95/131 (available through the NTIS, PB95- 261616). Earlier versions of this method ceased to be approved as of June 1, 2001.

(g) Before a community water system makes any significant modifications to its existing treatment process for the purpose of achieving compliance with 310 CMR 22.07(1), the supplier of water must submit to the Department for its approval a detailed plan setting forth the proposed modification and the safeguards which will be implemented to ensure that the bacteriological quality of the drinking water supplied to consumers by said community water system will not be adversely affected by such modification. Each community water system shall comply with the provisions set forth in the Department approved plan. Effective November 29, 1979, every plan approved by the Department shall, in addition to any other requirement imposed by the Department, require the community water system modifying its disinfection practice to:

1. Evaluate the water system for sanitary defects and evaluate the source water for biological purity.

2. Evaluate its existing treatment practices and consider improvements that will minimize disinfectant demand and optimize finished water quality throughout the distribution system.

3. Conduct additional monitoring to assure continued maintenance of optimal biological quality in finished water. Examples of when this requirement shall be enforced include when chloramines are introduced as disinfectants or when prechlorination is being discontinued. When chlorine dioxide is being used as a disinfectant, additional monitoring for chlorate, chlorite and chlorine dioxide shall be required except when the Department determines expressly and in writing that such monitoring is unnecessary. Standard plate count analyses shall also be required before and after any modifications unless the Department determines expressly and in writing that such analyses are not appropriate.

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4. Demonstrate an active disinfectant residual throughout the distribution system at all times during and after the modification.
5. Provide baseline water quality survey data of the distribution system as required by the Department.

22.07A: Synthetic Organic Chemicals (SOC) Sampling and Analytical Requirements

(1) Synthetic Organic Chemicals MCLs: The following maximum contaminant levels for organic contaminants apply to community water systems and non-transient, non-community water systems.

	CAS No.	Contaminant	MCL (mg/l)
(a)	15972-60-8	Alachlor	0.002
(b)	Reserved		
(c)	Reserved		
(d)	Reserved		
(e)	1912-24-9	Atrazine	0.003
(f)	1563-66-2	Carbofuran	0.04
(g)	57-74-9	Chlordane	0.002
(h)	96-12-8	Dibromochloropropane	0.0002
(i)	94-75-7	2,4-D	0.07
(j)	72-20-80	Endrin	0.002
(k)	106-93-4	Ethylene dibromide	0.00002
(l)	76-44-8	Heptachlor	0.0004
(m)	1024-57-3	Heptachlor epoxide	0.0002
(n)	58-89-9	Lindane	0.0002
(o)	72-43-5	Methoxychlor	0.04
(p)	1336-36-3	Polychlorinated biphenyls	0.0005
(q)	87-86-5	Pentachlorophenol	0.001
(r)	8001-35-2	Toxaphene	0.003
(s)	93-72-1	2,4,5-TP	0.05
(t)	50-32-8	Benzo(a)pyrene	0.0002
(u)	75-99-0	Dalapon	0.2
(v)	103-23-1	Di(2-ethylhexyl) adipate	0.4
(w)	117-81-7	Di(2-ethylhexyl) phthalate	0.006
(x)	88-85-7	Dinoseb	0.007
(y)	85-00-7	Diquat	0.02
(z)	145-73-3	Endothall	0.1
(aa)	1071-53-6	Glyphosate	0.7
(bb)	118-74-1	Hexachlorobenzene	0.001
(cc)	77-47-4	Hexachlorocyclopentadiene	0.05
(dd)	23135-22-0	Oxamyl (Vydate)	0.2
(ee)	1918-02-1	Picloram	0.5
(ff)	122-34-9	Simazine	0.004
(gg)	1746-01-6	2,3,7,8-TCDD(Dioxin)	$3x10^{-8}$

(2) SOC Sampling Requirements: Beginning with the initial compliance period, analysis of the contaminants listed in 310 CMR 22.07A(1)(a) through (gg) for the purposes of determining compliance with the maximum contaminant level shall be conducted as follows:

(a) SOC Ground Water Monitoring Protocols: Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(b) SOC Surface Water Monitoring Protocols: Surface water systems [Note: For purposes of 310 CMR 22.07A(2)(b), surface water systems include systems with a combination of surface and ground sources.) shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system

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after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(c) Multiple Sources: If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

(d) Consecutive System Monitoring: Public water systems that obtain water from another public water system are exempt from conducting compliance monitoring for the purchased portion of the system for the organic chemicals (SOC) under 310 CMR 22.07(A), provided that the system from which the water is obtained has conducted the analyses required under 310 CMR 22.07(A), unless otherwise specified by the Department.

(3) SOC Monitoring Frequency:

(a) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in 310 CMR 22.07A(1) during each compliance period beginning with the compliance period starting January 1, 1993.

(b) Systems serving more than 3,300 persons which do not detect a contaminant in the initial compliance period, may reduce the sampling frequency to a minimum of two quarterly samples in one year during each repeat compliance period.

(c) Systems serving less than or equal to 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of one sample during each repeat compliance period.

(4) SOC Sampling Waivers: Each community and non-transient water system may apply to the Department for a waiver from the requirement of 310 CMR 22.07A(3). A system must reapply for a waiver for each compliance period.

Basis of an SOC Sampling Waiver: The Department may grant a waiver after evaluating the following factor(s): Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the Department reveals no previous use of the contaminant within the watershed or Zone II or IWPA, a waiver may be granted. If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.

(a) Previous analytical results.

(b) The proximity of the system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities. Non-point sources include the use of pesticides to control insect and weed pests on agricultural areas, forest lands, home and gardens, and other land application uses.

(c) The environmental persistence and transport of the pesticide or PCBs.

(d) How well the water source is protected against contamination due to such factors as depth of the well and the type of soil and the integrity of the well casing and other protective measures considered relevant by the Department.

(e) Elevated nitrate levels at the water supply source.

(f) Use of PCBs in equipment used in the production, storage, or distribution of water (i.e., PCBs used in pumps, transformers, etc.).

(5) Detection of an SOC: If an organic contaminant listed in 310 CMR 22.07A(1) is detected (as defined by 310 CMR 22. 07A(16) in any sample, then:

(a) Each system shall report to the Department within seven days and shall monitor quarterly at each sampling point which resulted in a detection.

(b) The Department may decrease the quarterly monitoring requirement specified in 310 CMR 22.07A(5)(a) provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Department make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

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(c) After the Department determines the system is reliably and consistently below the maximum contaminant level the Department may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter that previously yielded the highest analytical result.
(d) Systems which have three consecutive annual samples with no detection of a contaminant may apply to the Department for a waiver as specified in 310 CMR 22.07A(4).
(e) If monitoring results in detection of one or more of certain related contaminants (heptachlor, heptachlor epoxide), then subsequent monitoring shall analyze for all related contaminants.

(6) MCL Violation and Reliably/Consistently Below the MCL: Systems which violate the requirements of 310 CMR 22.07A(1) as determined by 310 CMR 22.07A(9) must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the Department determines the system is reliably and consistently below the MCL, as specified in 310 CMR 22.07A(9), the system shall monitor at the frequency specified in 310 CMR 22.07A(5)(c).

(7) SOC Confirmation Sampling: The Department may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Department, the result must be averaged with the first sampling result and the average used for the compliance determination as specified by 310 CMR 22.07A(9). The Department has discretion to delete results of obvious sampling errors from this calculation.

(8) Composite SOC Sampling: The total number of samples which must be analyzed may be reduced by compositing samples. Composite samples from a maximum of five sampling points are allowed provided that the detection limit of the method used for analysis is less than one-fifth of the MCL and none of the samples to be composited are representative of multiple sources. Compositing of samples must be approved by the Department and must be done in the laboratory and analyzed within the holding times specified by EPA-814B-92-002, Change 2 - September 1992 *Manual for the Certification of Laboratories Analyzing Drinking Water*, third edition. Compositing of sources with previous detections greater than the detection limit is not allowed, unless otherwise authorized by the Department.
(a) If the concentration in the composite sample exceeds the detection limit for one or more contaminants listed in 310 CMR 22.07A(1), then a follow-up sample must be taken and analyzed from each sampling point included in the company within 14 days after completion of the composite analysis or before the holding time of the initial sample is exceeded, whichever is sooner.
(b) If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these duplicates instead of resampling. The duplicate must be analyzed and the results reported to the Department within 14 days of collection.
(c) If the population served by the system is >3,300 persons, then compositing may only be permitted by the Department at sampling points within a single system. In systems serving $\leq$3,300 persons, the Department may permit compositing among different systems provided the 5-sample limit is maintained.

(9) SOC Compliance Calculations: Compliance with 310 CMR 22.07A(1) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.
(a) Greater than Annual: For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.
(b) Annual or Less: Each supplier of water monitoring annually or less frequently whose sample result exceeds the regulatory detection level as defined by 310 CMR 22.07A(16) must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.

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(c) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.

(d) If a supplier of water fails to collect the required number of samples, compliance will be based on the total number of samples collected.

(e) If a sample result is less than the detection limit, zero will be used to calculate the annual average.

(f) Average Exceeding SOC MCLs: When the average of four analyses made pursuant to 310 CMR 22.07A(5), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 310 CMR 22.15 and give public notice to the public pursuant to 310 CMR 22.16. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as condition to variance, exemption or enforcement action shall become effective.

(10) SOC Analytical Methods: Analysis for the contaminants listed in 310 CMR 22.07A(1) shall be conducted using the following EPA methods or their equivalent as approved by EPA. These methods are contained in *Methods for the Determination of Organic Compounds in Drinking Water*, EPA-600/4-88-039, December 1988, Revised, July 1991, *Methods for the Determination of Organic Compounds in Drinking Water - Supplement I*, EPA 821-B-94-005, October 1994, *Methods for the Determination of Organic Compounds in Drinking Water - Supplement II*, EPA/600/R-92/129, August 1992. These documents and Method 1613, EPA/600/R-92/129, August 1992 are available from the National Technical Information Service, NTIS PB91-231480, PB91-146027, PB92-27703 and PB95-104774 (respectively), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. The phone number is 800-553-6847. Methods 504.1, 508.1 and 525.2 are available from U.S. EPA EMSL, Cincinnati, OH 45268. The phone number is 513-569-7586. Method 6610 is contained in *Standard Methods for the Examination of Water and Wastewater 18th Edition Supplement*, 1994, American Public Health Association, 1015 Fifteenth Street NW, Wash., D.C. 20005. Method 6651 is contained in *Standard Methods for the Examination of Water and Wastewater 18th Edition*, 1992, American Public Health Association, 1015 Fifteenth Street NW, Wash., D.C. 20005.

(a) Method 504.1, "1,2-Dibromoethane (EDB), 1,2-Dibromo-3-chloropropane (DBCP), and 1,2,3-Trichloropropane (1,2,3-TCP) in Water by Microextraction and Gas Chromatography." Method 504.1 can be used to measure dibromochloropropane (DBCP) and ethylene dibromide (EDB). Method 504.1 Rev 1.0 is effective until July 1, 2001.

(b) Method 505, "Analysis of Organohalide Pesticides and Commercial Polychlorinated Biphenyl (PCB) Products in Water by Microextraction and Gas Chromatography." Method 505 can be used to measure alachlor, atrazine, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor, toxaphene and simazine. Method 505 can be used as a screen for PCBs (as Aroclors). Method 505, Rev 2.0 is effective until June 1, 2001.

(c) Method 506, "Determination of Phthalate and Adipate Esters in Drinking Water by Liquid-Liquid Extraction or Liquid-Solid Extraction and Gas Chromatography with Photoionization Detection." Method 506 can be used to measure di(2-ethylhexyl) phthalate and di(2-ethylhexyl) adipate. Method 506 is effective until June 1, 2001.

(d) Method 507, "Determination of Nitrogen- and Phosphorus-Containing Pesticides in Ground Water by Gas Chromatography with a Nitrogen-Phosphorus Detector." Method 507 can be used to measure alachlor, atrazine and simazine. Method 507, Rev 2.0 is effective until June 1, 2001.

(e) Method 508, "Determination of Chlorinated Pesticides in Water by Gas Chromatography with an Electron Capture Detector." Method 508 can be used to measure chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor and toxaphene. Method 508 can be used as a screen for PCBs (as Aroclors). Method 508, Rev 2.0 is effective until June 1, 2001.

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(f) Method 508.1, Revision 1.0, "Determination of Chlorinated Pesticides, Herbicides, and Organohalides by Liquid-Solid Extraction and Electron Capture Gas Chromatography." Method 508.1 can be used to measure alachlor, atrazine, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor simazine and toxaphene, method 508.1 can be used as a screen for PCBs (as Aroclors Method 508.1 Rev 1.0 is effective until June 1, 2001.

(g) Method 508A, "Screening for Polychlorinated Biphenyls by Perchlorination and Gas Chromatography." Method 508A is used to quantify PCBs as decachlorobiphenyl if detected in Methods 505, 508, 508.1 or 508.2.

(h) Method 515.1, "Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector." Method 515.1 can be used to measure 2,4-D,dalapon, dinoseb, pentachlorophenol, picloram and 2,4,5-TP (Silvex). Method 515.1 Rev 1.0 is effective until June 1, 2001.

(i) Method 515.2, "Determination of Chlorinated Acids in Water using Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector." Method 515.2 can be used to measure 2,4-D, dinoseb, pentachlorophenol, picloram and 2,4,5-TP(Silvex). Method 515.2 Rev 1.0 is effective until June 1, 2001.

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(j) Method 515.3 can be used to measure 2,4-D dalapon, dinoseb, penachorophenol, and picloram.

(k) Method 525.2, Revision 1.0, "Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry." Method 525.2 can be used to measure alachlor, atrazine, benzo(a)pyrene, chlordane, di(2-ethylhexyl)adipate, di(2-ethylhexyl)phthalate, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor, pentachlorophenol, simazine and toxaphene. Method 525.2 Rev 1.0 is effective until July 1, 2001.

(l) Method 531.1, "Measurement of N-Methyl Carbamoyloximes and N-Methyl Carbamates in Water by Direct Aqueous Injection HPLC with Post-Column Derivatization." Method 531.1 can be used to measure, carbofuran and oxyamyl. Method 531.1 Rev 3.0 is effective until June 1, 2001.

(m) Method 547, "Determination of Gylphosate in Drinking Water by Direct Aqueous Injection HPLC with Post Column Derivatization, and Fluorescence Detection." Method 547 can be used to measure glyphosate.

(n) Method 548.1, "Determination of Endothall in Drinking Water by Ion-Exchange Extraction, Acidic Methanol Methylation and gas Chromatography/Mass Spectrometry." Method 548.1 can be used to measure endothall.

(o) Method 549.2, "Determination of Diquat and Paraquat in Drinking Water by Liquid-Solid Extraction and High Performance Liquid Chromatography with Ultraviolet Detection." Method 549.2 can be used to measure diquat.

(p) Method 550, "Determination of Polycyclic Aromatic Hydrocarbons in Drinking Water by Liquid-Liquid Extraction and HPLC with Coupled Ultraviolet and Fluorescence Detection." Method 550 can be used to measure benzo(a)pyrene.

(q) Method 550.1, "Determination of Polycyclic Aromatic hydrocarbons in Drinking Water by Liquid-Solid Extraction and HPLC with Coupled Ultraviolet and Fluorescence Detection." Method 550.1 can be used to measure benzo(a)pyrene.

(r) Method 551, "Determination of Chlorination Disinfection Byproducts and Chlorinated Solvents in Drinking Water by Liquid-Liquid Extraction and Gas Chromatography with Electron-Capture Detection." Method 551 can be used to measure ethylene dibromide (EDB), dibromochloropropane (DBCP), alachlor, atrazine, endrin, heptachlor, epoxide, lindane, methozychlor, simazine, hexachlorobenzene, and hexachlorocyclopentadiene. Method 551 is effective until June 1, 2001.

(s) Method 552.2, "Determination of Haloacetic Acids and Dalapon in Drinking Water by Ion-Exchange Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector." Method 552.2 can be used to measure dalapon.

(t) Method 555, "Determination of Chlorinated Acids in Water by High Performance Liquid Chromatography with a Photodiode Array Ultraviolet Detector." Method 555 can be used to measure 2,4-D, 2,4,5-TP(Silvex), dinoseb, pentachlorophenol and picloram.

(u) Method 1613, "Tetra- through Octa- Chlorinated Dioxins and Furans by Isotope Dilution." Method 1613 can be used to measure 2,3,7,8-TCDD (dioxin).

(v) Method 6610, "Carbamate Pesticides." Method 6610 can be used to measure carbofuran and oxamyl. Method 6610 shall be followed in accordance with *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), or 20th edition (1998), American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005. The cited methods published in any of these three editions may be used.

(w) Method 6651, "Glyphosate Herbicide (Proposed)*." Method 6651 can be used to measure glyphosate. Method 6651 shall be followed in accordance with *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), or 20th edition (1998), American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005. The cited methods published in any of these three editions may be used.

(x) Method ASTM D5317-93 can be used to measure 2,4D: 2,4,-TP (silvex), picloram, pentachlorophenol. ASTM Method D5317-93 is available in the *Annual Book of ASTM Standards*, 1999, Vol. 11.02, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

22.07A: continued

(11) Analysis for PCBs shall be conducted as follows:

(a) Each system that monitors for PCBs shall analyze each sample using either Method 508.1, 525.2, 508 or 505. The mean of the method detection limits of all Aroclors shall be 0.00025mg/l except for Aroclor 1221 which is 0.02 mg/l. Users of Method 505 may have more difficulty in achieving the required Aloclor detection limits than using methods 508.1, 525.2 or 508.

(b) If PCBs (as one of seven Aroclors) are detected as designated in 310 CMR 22.07A(11)(a) the system shall reanalyze the sample using Method 508A to quantitate PCBs (as decachlorobiphenyl).

(c) Compliance with the PCB MCL shall be determined based upon the quantitative results of analyses using Method 508A.

(12) Grandfathered SOC Data: The Department may allow the use of monitoring data collected after January 1, 1990, for purposes of satisfying the initial monitoring requirement of 310 CMR 22.07A(2), if in the opinion of the Department, the data are generally consistent with the requirements of 310 CMR 22.07A(2). A single sample rather than four quarterly samples may be allowed by the Department to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

(13) Increased SOC Sampling: The Department may increase the required monitoring frequency, where necessary, to detect variations within the system (e.g., fluctuations in concentration due to seasonal use, changes in water source).

(14) Enforcement: The Department has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

(15) Designated Sampling Schedules: Each public water system shall monitor at the time designated by the Department within each compliance period.

(16) SOC Detection Limits: Detection as used in 310 CMR 22.07A(5) shall be defined as greater than or equal to the following concentrations for each contaminant. (Please refer to the Guidelines and Policies for further information regarding detection limits).

SOC DETECTION LIMITS

Contaminant	Detection Limit mg/l
Alachlor	0.0002
Aldicarb	0.0005
Aldicarb sulfoxide	0.0005
Aldicarb sulfone	0.0008
Atrazine	0.0001
Benzo(a)pyrene	0.00002
Carbofuran	0.0009
Chlordane	0.0002
Dalapon	0.001
Dibromochloropropane (DBCP)	0.00002
Di (2-ethythexyl) adipate	0.0006
Di (2-ethylhexyl) phthalate	0.0006
Dinoseb	0.0002
Diquat	0.0004
2,4-D	0.0001
Endothall	0.009
Endrin	0.00001
Ethylene dibromide (EDB)	0.00001
Glyphosate	0.006
Heptachlor	0.00004
Heptachlor epoxide	0.00002
Hexachlorobenzene	0.0001

22.07A: continued

SOC DETECTION LIMITS - continued

Contaminant	Detection Limit mg/l
Hexachlorocyclopentadiene	0.0001
Lindane	0.00002
Methoxychlor	0.0001
Oxamyl	0.002
Picloram	0.0001
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	0.0001
Pentachlorophenol	0.00004
Simazine	0.00007
Toxaphene	0.001
2,3,7,8-TCDD (Dioxin)	0.000000005
2,4,5-TP (Silvex)	0.0002

(17) SYNTHETIC ORGANIC BATs: The EPA Administrator, pursuant to Section 1412 of the federal Safe Drinking Water Act, has identified as indicated in the Table below either granular activated carbon (GAC), packed tower aeration (PTA), or oxidation (OX) as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for organic contaminants identified in 310 CMR 22.07A(1):

BAT FOR ORGANIC CONTAMINANTS LISTED IN 310 CMR 22.07A(1)

CAS #	Chemical	GAC	PTA	OX
15972-60-8	Alachlor	X		
116-06-3	Aldicarb	X		
1646-88-4	Aldicarb sulfone		X	
1646-87-3	Aldicarb sulfoxide		X	
1912-24-9	Atrazine	X		
50-32-8	Benzo[a)pyrene	X		
1563-66-2	Carbofuran		X	
57-74-9	Chlordane	X		
75-99-0	Dalapon	X		
96-12-8	Dibromochloropropane (DBCP)	X	X	
75-09-2	Dichloreomethane		X	
103-23-1	Di (2-ethylhexyl) adipate	X	X	
117-81-7	Di (2-ethylhexyl) phthalate	X		
88-85-7	Dinoseb	X		
85-00-7	Diquat	X		
94-75-7	2,4-D	X		
72-20-80	Endrin	X		
145-73-3	Endothall	X		
106-93-4	Ethylene Dibromide (EDB)	X	X	
1071-53-6	Glyphosate			X
76-44-8	Heptachlor	X		
1024-57-3	Heptachlor epoxide	X		
118-74-1	Hexachlorobenzene	X		
77-47-3	Hexachlorocyclopentadiene	X	X	
58-89-9	Lindane	X		
72-43-5	Methoxychlor	X		
1336-36-3	Polychlorinated biphenyls(PCB)		X	
23135-22-0	Oxamyl (Vydate)	X		

22.07A: continued

BAT FOR ORGANIC CONTAMINANTS LISTED IN 310 CMR 22.07A(1)

CAS #	Chemical	GAC	PTA	OX
87-86-5	Pentachlorophenol	X		
1918-02-1	Picloram	X		
93-72-1	2,4,5-TP (Silvex)	X		
122-34-9	Simazine	X		
120-82-1	1,2,4-Trichlorobenzene	X	X	
79-00-5	1,1,2-Trichloroethane	X	X	
1746-01-6	2,3,7,8-TCDD(Dioxin)	X		
8001-35-2	Toxaphene	X	X	

(18) New Systems/Sources: Each new supplier of water or supplier of water that uses a new source of water that begins operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time specified by the Department. The supplier of water must also comply with the initial sampling frequencies specified by the Department to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in 310 CMR 22.07A.

22.07B: Maximum Contaminant Levels (MCLs) for Volatile Organic Compounds (VOC)

(1) Volatile Organic MCLs: The following maximum contaminant levels for organic contaminants apply to community and non-transient, non-community water systems.

	CAS No.	Contaminant		MCL (mg/l)
(a)	75-01-4	Vinyl chloride	0.002	
(b)	71-43-2	Benzene		0.005
(c)	56-23-5	Carbon tetrachloride		0.005
(d)	107-06-2	1,2-Dichloroethane		0.005
(e)	79-01-6	Trichloroethylene		0.005
(f)	106-46-7	para-Dichlorobenzene		0.005
(g)	75-35-4	1,1-Dichloroethylene		0.007
(h)	71-55-6	1,1,1-Trichloroethane		0.2
(i)	156-59-2	cis-1,2-Dichloroethylene		0.07
(j)	78-87-5	1,2-Dichloropropane		0.005
(k)	100-41-4	Ethylbenzene	0.7	
(l)	108-90-7	Monochlorobenzene		0.1
(m)	95-50-1	o-Dichlorobenzene		0.6
(n)	100-42-5	Styrene		0.1
(o)	127-18-4	Tetrachloroethylene		0.005
(p)	108-88-3	Toluene		1
(q)	156-60-5	trans-1,2-Dichloroethylene		0.1
(r)	1330-20-7	Xylenes (total)		10
(s)	75-09-2	Dichloromethane		0.005
(t)	120-82-1	1,2,4-Trichlorobenzene		0.07
(u)	79-00-5	1,1,2-Trichloroethane		0.005

(2) VOC Sampling Requirements: Beginning with the initial compliance period analysis of the contaminants listed in 310 CMR 22.07B(1) for the purpose of determining compliance with the maximum contaminant level the monitoring shall be conducted as follows:

(a) VOC Ground Water Monitoring Protocols: Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). If conditions warrant, the Department may designate additional sampling points within the distribution system or at the consumer's tap which more accurately determines consumer exposure. Each sample must be taken at the same sampling point unless the Department determine that conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.

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(b) VOC Surface Water Monitoring Protocols: Surface water systems (or combined surface/ground) shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). If conditions warrant, the Department may designate additional sampling points within the distribution system or at the consumer's tap which more accurately determines consumer exposure. Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.

(c) Multiple Sources: If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

(d) Initial VOCs Sampling Frequency: Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in 310 CMR 22.07B(1) during each compliance period, beginning in the initial compliance period.

(e) VOC Grandfathered Data with No Detects - Reduced Monitoring: If the initial monitoring for contaminants listed in 310 CMR 22.07B(1) as allowed in 310 CMR 22.07B(10), has been completed by December 31, 1992, and the system did not exceed the detection levels in 310 CMR 22.07B(4) any contaminant listed in 310 CMR 22.07B(1), then each ground and surface water system shall take one sample annually beginning with the initial compliance period.

(f) Reduced VOC Sampling - Annually: Groundwater and surface water systems which do not detect one of the contaminants listed in 310 CMR 22.07B(1) after conducting the initial round of monitoring required in 310 CMR 22.07B(2)(a)&(b) shall take one sample annually.

(3) VOC Sampling Waivers: Each community and non-transient non-community system which does not detect a contaminant listed in 310 CMR 22.07B(1) may apply to the Department for a waiver from the requirements of 310 CMR 22.07B(2)(d) and (f) and 310 CMR 22.07B(10) after completing the initial monitoring. (For the purposes of 310 CMR 22.07B, detection is defined as $\geq$0.0005 mg/l.) A waiver shall be effective for no more than three years (one compliance period).

(a) Basis of a VOC Sampling Waiver: A Department may grant a waiver after evaluating the following factor(s):

1. Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the State reveals no previous use of the contaminant within the watershed or Zone II or IWPA, a waiver may be granted.

2. If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.

a. Previous analytical results.

b. The proximity of the system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.

c. The environmental persistence and transport of the contaminants.

d. The number of persons served by the public water system and the proximity of a smaller system to a larger system.

e. How well the water source is protected against contamination, such as whether it is a surface or groundwater system and other protective measures considered relevant by the Department. Groundwater systems must consider factors such as depth of the well, the type of soil, and wellhead protection. Surface water systems must consider watershed protection.

22.07B: continued

(b) VOC Waiver Requirements for GW Systems: As a condition of the waiver a groundwater system must take one sample at each sampling point during the time the waiver is effective (*i.e.*, one sample during one compliance period or three years) and update its vulnerability assessment considering the factors listed in 310 CMR 22.07B(3)(a). Based on this vulnerability assessment the Department must reconfirm that the system is non-vulnerable. If the Department does not make this reconfirmation within three years of the initial determination, then the waiver is invalidated and the system is required to sample annually as specified in 310 CMR 22.07B(10)(a).

(c) VOC Waiver Requirements for SW Systems: Each community and non-transient non-community surface water system which does not detect a contaminant listed in 310 CMR 22.07B(1) may apply to the Department for a waiver from the requirements of 310 CMR 22.07B(2)(a) after completing the initial monitoring. Systems meeting this criteria must be determined by the Department to be non-vulnerable based on a vulnerability assessment during each compliance period. Each system receiving a waiver shall sample at the frequency specified by the Department.

(4) Detection of a VOC:

(a) If a contaminant listed in 310 CMR 22.07B(1) is detected at a level exceeding 0.0005 mg/l in any sample, then:

1. The system shall report to the Department within seven days and shall monitor for the contaminants listed in 310 CMR 22.07B quarterly at each sampling point which resulted in a detection.

2. The Department may decrease the quarterly monitoring requirement specified in 310 CMR 22.07B(4)(a)1. provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Department make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

3. If the Department determines that the system is reliably and consistently below the MCL, the Department may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter(s) which previously yielded the highest analytical result or as specified by the Department.

(b) Detection Of a VOC Other Than Those Listed In 310 CMR 22.07B(1): Systems which detect any VOC contaminants at any level shall report the results to the Department.

(c) VOCs Reliably & Consistently Below the MCL: Systems which violate the requirements of 310 CMR 22.07B(1), as determined by 310 CMR 22.07B(7), must monitor quarterly. After a minimum of four consecutive quarterly samples which show the system is in compliance as specified in 310 CMR 22.07B(7) the system demonstration and the Department determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and time specified in 310 CMR 22.07B(4)(a)3.

(5) VOC Confirmation Samples: The Department may require a confirmation sample for positive or negative results. The results of the confirmation sample must be averaged with the first sampling result and the average is used for the compliance determination as specified by 310 CMR 22.07B(7). The Department has the discretion to delete results of obvious sampling errors from this calculation.

(6) VOC Composite Samples: The total number of samples a system must analyze may be reduced, with the Department's approval, by the compositing of samples. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL and none of the samples to be composited are representative of multiple sources. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection. Compositing of sources with previous detections exceeding the detection limit is not allowed, unless otherwise authorized by the Department. If duplicates of the original samples taken from each sampling point used in the composit samples are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the Department within 14 days after completing the analyses of the composited samples, provided the holding times of the samples has not been exceeded.

22.07B: continued

(a) If the concentration in the composite sample is ≥0.0005 mg/l for any contaminant listed in 310 CMR 22.07B(1), then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite.

(b) If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicate must be analyzed and the results reported to the Department within 14 days of collection.

(c) Compositing will be permitted at sampling points within a single system, unless the population served by the system is ≤3,300 persons. In systems serving ≤3,300 persons, compositing is permitted with the Department's approval among different systems provided the 5-sample limit is maintained.

(d) Compositing samples prior to GC analysis.

1. Add 5 ml or equal larger amounts of each sample (up to five samples are allowed) to a 25 ml glass syringe. Special precautions must be made to maintain zero headspace in the syringe.
2. The samples must be cooled at 4°C during this step to minimize volatilization losses.
3. Mix well and draw out a 5-ml aliquot for analysis.
4. Follow sample introduction, purging, and desorption steps described in the method.
5. If less than five samples are used for compositing, a proportionately small syringe may be used.

(e) Compositing samples prior to GC/MS analysis.

1. Inject 5-ml or equal larger amounts of each aqueous sample (up to five samples are allowed) into a 25-ml purging device using the sample introduction technique described in the method.
2. The total volume of the sample in the purging device must be 25 ml.
3. Purge and desorb as described in the method.

(7) VOC Compliance Calculations: Compliance with 22.07B(1) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.

(a) Greater than Annual For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.

(b) Annually or Less: Each supplier of water monitoring annually or less frequently whose sample result exceeds the MCL must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.

(c) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.

(d) If a supplier of water fails to collect the required number of samples, compliance will be based on the total number of samples collected.

(e) If a sample result is less than the detection limit, zero will be used to calculate the annual average.

(f) Enforcement: The Department has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

(g) Average Exceeding VOC MCLs: When the average of four analyses made pursuant to 310 CMR 22.07B(4), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the Department pursuant to 310 CMR 22.15 and give notice to the public pursuant to 310 CMR 22.16. Monitoring after public notification shall be at a frequency designated by the Department and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as condition to variance, exemption or enforcement action shall become effective.

(8) VOC Analytical Methods: Analysis for the contaminants listed in 22.07B(1) shall be conducted using the following EPA methods or their equivalent as approved by EPA. Methods 502.2 is in *Methods for the Determination of Organic Compounds in Drinking Water*, EPA-600/4-88-039, December 1988, Revised, July 1991. Methods 524.2 is in *Methods for the Determination of Organic Compounds in Drinking Water - Supplement III*, EPA/600/R-95/131, August 1995.

22.07B: continued

(a) Method 502.2, "Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series." Method 502.2 Rev 2.0 is effective until July 1, 2000.
(b) Method 524.2, "Measurement of Purgeable Organic Compounds in Water by "Capillary Column Gas Chromatography/Mass Spectrometry."
(c) Method 551.1 can be used to measure carbon tetrachloride, tetrachloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene.

(9) Reserved

(10) Grandfathered VOC Data: The Department may allow the use of monitoring data collected after January 1, 1988, for purposes of complying with initial compliance period. If the data are generally consistent with the other requirements in 310 CMR 22.07B, the Department may use these data (i.e., a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of 310 CMR 22.07B(2)(d). Systems which use grandfathered samples and did not detect any contaminants listed in 310 CMR 22.07B(1) shall begin monitoring annually in accordance with 310 CMR 22.07B(2)(e) beginning with the initial compliance period.

(11) Increased VOC Sampling: The Department may increase required monitoring where necessary to detect variations within the system.

(12) VOC Sampling Schedules: Each public water system shall monitor at the time designated by the Department within each compliance period.

(13) Consecutive System Monitoring: Public water systems that obtain water from another public water system are exempt from conducting compliance monitoring for the purchased portion of the system for the volatile organic chemicals under 310 CMR 22.07B, provided that the system from which the water is obtained has conducted the analyses required under 310 CMR 22.07B, unless otherwise specified by the Department.

(14) Volatile Organic BATs: The Department hereby identifies as indicated in the Table below either granular activated carbon (GAC), packed tower aeration (PTA), or both as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for organic contaminants identified in 310 CMR 22.07B(1):

BAT FOR ORGANIC CONTAMINANTS

CAS #	Chemical	GAC	PTA
71-43-2	Benzene	X	X
56-23-5	Carbon tetrachloride	X	X
95-50-1	o-Dichlorobenzene	X	X
107-06-2	1,2-Dichloroethane	X	X
156-59-2	cis-1,2-Dichloroethylene	X	X
156-60-5	trans-1,2-Dichloroethylene	X	X
75-35-4	1,1-Dichloroethylene	X	X
78-87-5	1,2-Dichloropropane	X	X
100-41-4	Ethylbenzene	X	X
108-90-7	Monochlorobenzene	X	X
106-46-7	para-Dichlorobenzene	X	X
100-42-5	Styrene	X	X
127-18-4	Tetrachloroethylene	X	X
71-55-6	1,1,1-Trichloroethane	X	X
79-01-6	Trichloroethylene	X	X
108-88-3	Toluene	X	X
75-01-4	Vinyl chloride		X
1330-20-7	Xylene	X	X

22.07B: continued

(15) New Systems/Sources: Each new supplier of water or supplier of water that use a new source of water that begin operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time specified by the Department. The supplier of water must also comply with the initial sampling frequencies specified by the Department to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in 310 CMR 22.07B.

22.07C: Unregulated Inorganic and Organic Chemicals Special Monitoring

(1) Monitoring for Unregulated Organic and Inorganic Contaminants: The Monitoring frequency for the contaminants listed in 310 CMR 22.07C(5), (7) and (8) shall be as follows.

(a) Sampling for Synthetic Organic Contaminants: Reserved.

(b) Sampling for Inorganic Contaminants: Reserved.

(c) Sampling for Volatile Organic Contaminants: Each community and non-transient non-community water system shall take one sample at each sampling point for each contaminant listed in 310 CMR 22.07C(5) and report the results to the Department. Monitoring shall be completed at the same time as routine VOC sampling in accordance with 310 CMR 22.07B.

NON-TEXT PAGE

22.07C: continued

(2) Sampling Locations: The sampling for the contaminants listed in 310 CMR 22.07C shall be conducted as follows:

(a) Ground Water Sampling Protocols: Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample shall be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(b) Surface Water Sampling Protocols: Surface water systems including, but not limited to surface water systems with a combination of surface and ground sources shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample shall be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(c) Multiple Sources: If the system draws water from more than one source and the sources are combined before distribution, the system shall sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

(d) Confirmation Sampling: The Department may require a confirmation sample for positive or negative results.

(e) Composite Sampling: The Department may reduce the total number of samples a system shall analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples shall be done in the laboratory and the composite sample shall be analyzed within 14 days of collection and comply with 310 CMR 22.07B(6)(a) through (e). If the population served by the system is >3,300 persons, then compositing may only be permitted by the Department at sampling points within a single system. In systems serving $\leq$3,300 persons, the Department may permit compositing among different systems provided the 5-sample limit is maintained.

(3) Reserved.

(4) Sampling Waivers: Each community and non-transient non-community water system may apply to the Department for a waiver from the requirements of 310 CMR 22.07C(1)(a),(b) and (c).

Basis of Sampling Waivers: The Department may grant a waiver for the monitoring requirement of 310 CMR 22.07C(5) based on the criteria specified in 310 CMR 22.07B(3)(a). Waivers for monitoring requirements of 310 CMR 22.07C(7) are based on the criteria specified in 310 CMR 22.07A(4). The Department may grant a waiver from the requirement of 310 CMR 22.07C(8) if previous analytical results indicate contamination would not occur, provided this data was collected after January 1, 1990.

(5) Unregulated VOC Contaminants: Methyl tert-butyl ether (MTBE)

(6) EPA Analytical Methods for Unregulated VOC Contaminants: Analysis for the contaminants listed in 310 CMR 22.07C(5) shall be conducted using the recommended EPA methods at 310 CMR 22.07B(8).

(7) Unregulated Synthetic Organic Contaminants and Analytical Methods: Reserved.

(8) Unregulated Inorganic Contaminants and Analytical Methods: Reserved.

(9) Repeat Monitoring: All community and non-transient, non-community water systems shall repeat the monitoring for contaminants listed in 310 CMR 22.07C(5) no less frequently than every three years or in accordance with the sampling frequencies in 310 CMR 22.07(B).

(10) Reserved.

22.07C: continued

(11) Analysis under 310 CMR 22.07C shall be conducted by laboratories approved under 310 CMR 42.00, using the recommended EPA methods listed at 310 CMR 22.07A(10).

22.07D: Secondary Chemical Standards

(1) Secondary Contaminants. The following contaminant levels apply to every public water systems:

Contaminant	Secondary MCL
(a) Aluminum	0.05 to 0.2 mg/l
(b) Chloride	250 mg/l
(c) Color	15 Color Units
(d) Copper	1 mg/l
(e) Reserved	
(f) Foaming Agents	0.5 mg/l
(g) Iron	0.3 mg/l
(f) Manganese	0.05 mg/l
(g) Odor	3 Threshold Unit Number
(h) pH	6.5 – 8.5
(i) Silver	0.10 mg/l
(j) Sulfate	250 mg/l
(k) Total Dissolved Solids	500 mg/l
(l) Zinc	5 mg/l

(2) Monitoring for Secondary Contaminants: The monitoring frequency for the contaminants listed in 310 CMR 22.07D(1) is at the discretion of the Department.

(3) Exceeding a Secondary Maximum Contaminant Level:. If the Department finds based on a health evaluation by the Department's Office of Research and Standards, that an SMCL exceedance, acting alone or in combination with other contaminants, poses an unacceptable health risk to consumers, the public water system shall take all actions necessary to reduce the SMCL concentrations to levels the Department deems safe by the deadline specified by the Department. Such public water system shall also monitor the water and provide public notice as directed by the Department and notify the Department in writing of its proposed actions.

(4) The analytical methods for Secondary Contaminants are available in the Federal Register/Vol. 67, No. 205/October 23, 2002.

22.07E: Disinfection Byproducts, Disinfectant Residuals and Disinfection Byproduct Precursors

(1) MCLs for Disinfection Byproducts. The maximum contaminant levels for disinfection byproducts of 310 CMR 22.07E apply only to community water systems and non-transient non-community water systems which add a chemical disinfectant (oxidant) to the water in any part of the drinking water treatment process. The MCLs are as follows:

Disinfection Byproduct	MCL (mg/l)
Total Trihalomethanes (TTHM)	0.080
Haloacetic acids (five) (HAA5)	0.060
Bromate	0.010
Chlorite	1.0

Total Trihalomethanes are the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform) expressed in milligrams per liter (mg/l). Haloacetic acids are the sum of the concentrations of monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid and dibromoacetic acid expressed in milligrams per liter (mg/l).

22.07E: continued

(2) MRDLs for Disinfectant Residuals. The maximum residual disinfectant levels for the disinfectant residuals of 310 CMR 22.07E apply to community water systems and non-transient non-community water systems which add a chemical disinfectant (oxidant) to the water in any part of the drinking water treatment process. In addition, the maximum residual disinfectant level for chlorine dioxide applies to transient non-community water systems using chlorine dioxide as a disinfectant or oxidant. The MRDLs are as follows:

Disinfectant Residual	MRDL (mg/l)
Chlorine	4.0 (as Cl_2).
Chloramines	4.0 (as Cl_2).
Chlorine dioxide	0.8 (as ClO_2).

Notwithstanding the MRDLs in 310 CMR 22.07E(2), systems may increase residual disinfectant levels in the distribution system of chlorine or chloramines (but not chlorine dioxide) to a level and for a time necessary to protect public health, to address specific microbiological contamination problems caused by circumstances including, but not limited to, distribution line breaks, storm run-off events, source water contamination events, or cross connection events.

(3) Compliance Dates.

(a) Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water that serves 10,000 or more persons shall comply with the requirements of 310 CMR 22.07E beginning January 1, 2002.

(b) Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water that serves fewer than 10,000 persons and each supplier of water who uses only a ground water source not under the direct influence of surface water shall comply with the requirements of 310 CMR 22.07E beginning January 1, 2004.

(c) Each supplier of water that plans to install granular activated carbon (GAC) or membrane technology to comply with the MCLs in 310 CMR 22.07E(1) may apply to the Department for an extension of up to 24 months past the dates in 310 CMR 22.07E(3)(a) and (b), but not beyond December 31, 2003. In granting the extension, the Department will require the system to issue public notice in accordance with 310 CMR 22.16. The notice shall include the length of the extension, the mandatory health effects language for disinfection byproducts and the anticipated schedule for the construction and implementation of the new treatment processes. The Department may also require the supplier of water to perform an engineering study to optimize the current treatment processes to minimize the formation of disinfection byproducts during the period of the extension.

(4) Disinfection Byproducts BATs. The EPA Administrator, pursuant to Section 1412 of the federal Safe Drinking Water Act, has identified the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for disinfection byproducts identified in of 310 CMR 22.07E(1):

Disinfection Byproduct	Best Available Technology
TTHM	Enhanced coagulation or enhanced softening or GAC10, with chlorine as the primary and residual disinfectant.
HAA5	Enhanced coagulation or enhanced softening or GAC10, with chlorine as the primary and residual disinfectant.
Bromate	Control of ozone treatment process to reduce production of bromate
Chlorite	Control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels.

(5) Disinfectant Residuals BATs. The EPA Administrator, pursuant to Section 1412 of the federal Safe Drinking Water Act, has identified the control of treatment processes to reduce disinfectant demand and the control of disinfection treatment processes to reduce disinfectant levels as the best technology, treatment techniques, or other means available for achieving compliance with the maximum residual disinfectant levels for disinfectant residuals identified in 310 CMR 22.07E(2).

22.07E: continued

(6) Analytical Requirements.

(a) Each supplier of water shall use only the analytical method(s) specified in 310 CMR 22.07E(6), or as otherwise approved by EPA for monitoring under 310 CMR 22.07E, to demonstrate compliance with the requirements of 310 CMR 22.07E. These methods are effective for compliance monitoring as of February 16, 1999.

(b) The methods described in 310 CMR 22.07E(6) are contained within the following documents: EPA Method 552.1 is in *Methods for the Determination of Organic Compounds in Drinking Water - Supplement II*, USEPA, August 1992, EPA/600/R-92/129 (available through the National Technical Information Service (NTIS), PB92-207703). EPA Methods 502.2, 524.2, 551.1, and 552.2 are in *Methods for the Determination of Organic Compounds in Drinking Water - Supplement III*, USEPA, August 1995, EPA/600/R-95/131 (available through the NTIS, PB95- 261616). EPA Method 300.0 is in *Methods for the Determination of Inorganic Substances in Environmental Samples*, USEPA, August 1993, EPA/600/R-93/100 (available through the NTIS, PB94-120821). EPA Method 300.1 is titled USEPA Method 300.1, Determination of Inorganic Anions in Drinking Water by Ion Chromatography, Revision 1.0, USEPA, 1997, EPA/600/R-98/118 (available through the NTIS, PB98-169196); also available from: Chemical Exposure Research Branch, Microbiological & Chemical Exposure Assessment Research Division, National Exposure Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH 45268, Fax Number: 513-569-7757, Phone number: 513-569-7586. Except where noted, all methods refer to *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), or 20th edition (1998), American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005. The cited methods published in any of these three editions may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005. ASTM Method D 1253-86 shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 1996 edition; copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohoken, PA 19428.

(c) Disinfection Byproducts.

1. Each supplier of water shall measure disinfection byproducts by the methods (as modified by the footnotes) listed in the following table:

Approved Methods for Disinfection Byproduct Compliance Monitoring

Methodology [2]	EPA Method	Standard Method	Byproduct Measured [1]			
			TTHM	HAA5	Chlorite[4]	Bromate
P&T/GC/ElCD & PID	502.23		X			
P&T/GC/MS	524.2		X			
LLE/GC/ECD	551.1		X			
LLE/GC/ECD		6251 B		X		
SPE/GC/ECD	552.1			X		
LLE/GC/ECD	552.2			X		
Amperometric Titration		4500-ClO_2 E			X	
IC	300				X	
IC	300.1				X	X

[1] X indicates method is approved for measuring specified disinfection byproduct.

[2] P&T = purge and trap; GC = gas chromatography; ElCD = electrolytic conductivity detector; PID = photoionization detector; MS = mass spectrometer; LLE = liquid/liquid extraction; ECD = electron capture detector; SPE = solid phase extractor; IC = ion chromatography.

[3] If TTHMs are the only analytes being measured in the sample, then a PID is not required.

[4] Amperometric titration may be used for routine daily monitoring of chlorite at the entrance to the distribution system, as prescribed in 310 CMR 22.07E(7)(b)2.a.i. Ion chromatography shall be used for routine monthly monitoring of chlorite and additional monitoring of chlorite in the distribution system, as prescribed in 310 CMR 22.07E(7)(b)2.a.ii. and (b)2.b.

22.07E: continued

2. Analysis under 310 CMR 22.07E(6) for disinfection byproducts shall be conducted by laboratories that have received certification by EPA or the Department, except as specified under 310 CMR 22.07E(6)(c)3.

3. A party approved by EPA or the Department shall measure daily chlorite samples at the entrance to the distribution system.

(d) Disinfectant Residuals.

1. Each supplier of water shall measure the residual disinfectant concentration for free chlorine, combined chlorine (chloramines), and chlorine dioxide by the methods listed in the following table:

Approved Methods for Disinfectant Residual Compliance Monitoring

Methodology	Standard Method	ASTM Method	Residual Measured [1]			
			Free Chlorine	Combined Chlorine	Total Chlorine	Chlorine Dioxide
Amperometric Titration	4500-Cl D	D 1253-86	X	X	X	
Low Level Amperometric Titration	4500-Cl E				X	
DPD Ferrous Titrimetric	4500-Cl F		X	X	X	
DPD Colorimetric	4500-Cl G		X	X	X	
Syringaldazine (FACTS)	4500-Cl H		X			
Iodometric Electrode	4500-Cl I				X	
DPD	4500-ClO_2 D					X
Amperometric Method II	4500-ClO_2 E					X

[1] X indicates method is approved for measuring specified disinfectant residual.

2. Each supplier of water may also measure residual disinfectant concentrations for chlorine, chloramines, and chlorine dioxide by using digital meter versions of DPD colorimetric test kits. Suppliers serving less than or equal to 3300 persons may use non-digital meter DPD colorimetric test kits.

3. The Department approves all laboratory personnel (both in-house and at Department certified laboratories) as well as certified operators to conduct measurements of residual disinfectant concentrations. All parties conducting these measurements shall be approved by the Department and shall be trained in the relevant methodology and/or the use of the relevant equipment and shall follow procedures outlines by the manufacturer of that equipment.

(e) Additional Analytical Methods. Each supplier of water who is required to analyze parameters not included in 310 CMR 22.07E(6)(c) and (d) shall use the following methods. A party approved by the Department as per 310 CMR 22.07E(6)(d)3. shall measure these parameters.

1. Alkalinity. All methods allowed in 310 CMR 22.06B(10) for measuring alkalinity.

2. Bromide. EPA Method 300.0 or EPA Method 300.1.

3. Total Organic Carbon (TOC). Standard Method 5310 B (High-Temperature Combustion Method) or Standard Method 5310 C (Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method) or Standard Method 5310 D (Wet-Oxidation Method). TOC samples may not be filtered prior to analysis. TOC samples shall either be analyzed or shall be acidified to achieve pH less than 2.0 by minimal addition of phosphoric or sulfuric acid as soon as practical after sampling, not to exceed 24 hours. Acidified TOC samples shall be analyzed within 28 days.

4. Specific Ultraviolet Absorbance (SUVA). SUVA is equal to the UV absorption at 254nm (UV_{254}) (measured in m^{-1} divided by the dissolved organic carbon (DOC) concentration (measured as mg/l). In order to determine SUVA, it is necessary to separately measure UV_{254} and DOC. When determining SUVA, systems shall use the methods stipulated in 310 CMR 22.07E(6)(e)4.a. to measure DOC and the method stipulated in 310 CMR 22.07E(6)(e)4.b. to measure UV_{254}. SUVA shall be determined on water prior to the addition of disinfectants/oxidants by the system. DOC and UV_{254} samples used to determine a SUVA value shall be taken at the same time and at the same location.

22.07E: continued

a. Dissolved Organic Carbon (DOC). Standard Method 5310 B (High-Temperature Combustion Method) or Standard Method 5310 C (Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method) or Standard Method 5310 D (Wet-Oxidation Method). Prior to analysis, DOC samples shall be filtered through a 0.45 μm pore-diameter filter. Water passed through the filter prior to filtration of the sample shall serve as the filtered blank. This filtered blank shall be analyzed using procedures identical to those used for analysis of the samples and shall meet the following criteria: DOC <0.5 mg/l. DOC samples shall be filtered through the 0.45 μm pore-diameter filter prior to acidification. DOC samples shall either be analyzed or shall be acidified to achieve pH less than 2.0 by minimal addition of phosphoric or sulfuric acid as soon as practical after sampling, not to exceed 48 hours. Acidified DOC samples shall be analyzed within 28 days.

b. Ultraviolet Absorption at 254 nm (UV_{254}). Method 5910 B (Ultraviolet Absorption Method). UV absorption shall be measured at 253.7 nm (may be rounded off to 254 nm). Prior to analysis, UV_{254} samples shall be filtered through a 0.45 μm pore-diameter filter. The pH of UV_{254} samples may not be adjusted. Samples shall be analyzed as soon as practical after sampling, not to exceed 48 hours.

5. pH. All methods allowed in 310 CMR 22.06B(10) for measuring pH.

(7) Monitoring Requirements.

(a) General Requirements.

1. Each supplier of water shall take all samples during normal operating conditions.

2. For the purpose of determining the minimum number of required TTHM and HAA5 samples, the Department may allow multiple wells drawing water from the same aquifer but entering the distribution system at different locations to be considered one treatment plant. Upon written request from a supplier of water, the Department will make this determination based on the following criteria:

a. The wells must be shown to be in the same aquifer using Department GIS and USGS information.

b. The wells must be treated in the same fashion or with processes that can be shown to be equivalent with respect to the potential to form disinfection byproducts.

c. TOC samples from each well under consideration, taken at the same time during the warmest month of the year, must have comparable results.

3. Each supplier of water shall monitor in accordance with the monitoring plan required under 310 CMR 22.07E(7)(f).

4. Each supplier of water may use only data collected under the provisions of 310 CMR 22.07E or EPA's Information Collection Rule to qualify for reduced monitoring.

5. Each supplier of water who qualifies for reduced monitoring shall obtain Department approval prior to altering sampling practices.

(b) Monitoring Requirements for Disinfection Byproducts.

1. TTHM and HAA5.

a. Routine Monitoring. Each supplier of water shall monitor at the frequency indicated in the following table:

22.07E: continued

Routine Monitoring Frequency for TTHM and HAA5

Type of system	Minimum monitoring frequency	Sample location in the distribution system
Systems using surface water or ground water under the direct influence of surface water serving at least 10,000 persons.	Four water samples per quarter per treatment plant.	At least 25% of all samples collected each quarter at locations representing maximum residence time. Remaining samples taken at locations representative of at least average residence time in the distribution system and representing the entire distribution system, taking into account number of persons served, different sources of water, and different treatment methods.[1]
Systems using surface water or ground water under the direct influence of surface water serving from 500 to 9,999 persons.	One water sample per quarter per treatment plant.	Locations representing maximum residence time.[1]
Systems using surface water or ground water under the direct influence of surface water serving fewer than 500 persons.	One sample per year per treatment plant during month of warmest water temperature.	Locations representing maximum residence time.[1] If the sample (or average of annual samples, if more than one sample is taken) exceeds the MCL, the system shall increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until the system meets reduced monitoring criteria in 310 CMR 22.07E(7)(b)1.d.
Systems using only ground water not under direct influence of surface water using chemical disinfectant and serving at least 10,000 persons.	One water sample per quarter per treatment plant.[2]	Locations representing maximum residence time.[1]
Systems using only ground water not under direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons.	One sample per year per treatment plant during month of warmest water temperature.[2]	Locations representing maximum residence time.[1] If the sample (or average of annual samples, if more than one sample is taken) exceeds the MCL, the system shall increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until the system meets reduced monitoring criteria in 310 CMR 22.07E(7)(b)1.d.

[1] If a system elects to sample more frequently than the minimum required, at least 25% of all samples collected each quarter (including those taken in excess of the required frequency) shall be taken at locations that represent the maximum residence time of the water in the distribution system. The remaining samples shall be taken at locations representative of at least average residence time in the distribution system.

[2] Multiple wells drawing water from a single aquifer may be considered one treatment plant for determining the minimum number of samples required, with prior Department approval in accordance with criteria developed under 310 CMR 22.07E(7)(a)2.

b. A supplier of water may reduce monitoring, except as otherwise provided, in accordance with the following table:

22.07E: continued

Reduced Monitoring Frequency for TTHM and HAA5

If you are a . . .	You may reduce monitoring if you have monitored at least one year and your . .	To this level
System using surface water or ground water under the direct influence of surface water serving at least 10,000 persons which has a source water annual average TOC level, before any treatment, ≤ 4.0 mg/l.	TTHM annual average ≤ 0.040 mg/l and HAA5 annual average ≤ 0.030 mg/l.	One sample per treatment plant per quarter at distribution system location reflecting maximum residence time.
System using surface water or ground water under the direct influence of surface water serving from 500 to 9,999 persons which has a source water annual average TOC level, before any treatment, ≤ 4.0 mg/l.	TTHM annual average ≤ 0.040 mg/l and HAA5 annual average ≤ 0.030 mg/l.	One sample per treatment plant per year at distribution system location reflecting maximum residence time during month of warmest water temperature. NOTE: Any system using surface water or ground water under the direct influence of surface water serving fewer than 500 persons may not reduce its monitoring to less than one sample per treatment plant per year.
System using only ground water not under direct influence of surface water using chemical disinfectant and serving at least 10,000 persons.	TTHM annual average≤ 0.040 mg/l and HAA5 annual average ≤ 0.030 mg/l.	One sample per treatment plant per year at distribution system location reflecting maximum residence time during month of warmest water temperature.
System using only ground water not under direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons.	TTHM annual average≤ 0.040 mg/l and HAA5 annual average ≤ 0.030 mg/l for two consecutive years OR TTHM annual average ≤ 0.020 mg/l and HAA5 annual average ≤ 0.015 mg/l for one year.	One sample per treatment plant per three year monitoring cycle at distribution system location reflecting maximum residence time during the month of warmest water temperature, with the three-year cycle beginning on January 1 following the quarter in which system qualifies for reduced monitoring.

c. Each supplier of water on a reduced monitoring schedule may remain on that reduced schedule as long as the average of all samples taken in the year (for systems which shall monitor quarterly) or the result of the sample (for systems which shall monitor no more frequently than annually) is no more than 0.060 mg/l and 0.045 mg/l for TTHM and HAA5, respectively. Systems that do not meet these levels shall resume monitoring at the frequency identified in 310 CMR 22.07E(7)(b)1.a. (minimum monitoring frequency column) in the quarter immediately following the monitoring period in which the system exceeds 0.060 mg/l or 0.045 mg/l for TTHM or HAA5, respectively. For each supplier of water using ground water not under the direct influence of surface water and serving fewer than 10,000 persons, if either the TTHM annual average is > 0.080 mg/l or the HAA5 annual average is > 0.060 mg/l, the system shall go to increased monitoring identified in 310CMR 22.07E(7)(b)1a (sample location in the distribution system column) in the quarter immediately following the monitoring period in which the system exceeds 0.080 mg/l or 0/060 mg/l for TTHM or HAA5 respectively.

d. Each supplier of water on increased monitoring may return to routine monitoring if after at least one year of monitoring their TTHM annual average is≤ 0.060 mg/l and their HAA5 annual average is ≤ 0.045 mg/l.

e. The Department may return a supplier of water to routine monitoring at the Department's discretion.

22.07E: continued

2. Chlorite. An owner or operator of community and nontransient noncommunity water systems using chlorine dioxide, for disinfection or oxidation, shall conduct monitoring for chlorite.

a. Routine Monitoring.

i. Daily Monitoring. Each supplier of water shall take daily samples at the entrance to the distribution system. For any daily sample that exceeds the chlorite MCL, the supplier shall take additional samples in the distribution system the following day at the locations required by 310 CMR 22.07E(7)(b)2.b. in addition to the sample required at the entrance to the distribution system.

ii. Monthly Monitoring. Each supplier of water shall take a three-sample set each month in the distribution system. The supplier shall take one sample at each of the following locations: near the first customer, at a location representative of average residence time, and at a location reflecting maximum residence time in the distribution system. Any additional routine sampling shall be conducted in the same manner (as three-sample sets, at the specified locations). Each supplier of water may use the results of additional monitoring conducted under 310 CMR 22.07E(7)(b)2.b. to meet the requirement for monitoring in 310 CMR 22.07E(7)(b)2.a.ii.

b. Additional Monitoring. On each day following a routine sample monitoring result that exceeds the chlorite MCL at the entrance to the distribution system, the supplier of water is required to take three chlorite distribution system samples at the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

c. Reduced Monitoring.

i Chlorite monitoring at the entrance to the distribution system required by 310 CMR 22.07E(7)(b)2.a.i. may not be reduced.

ii Chlorite monitoring in the distribution system required by 310 CMR 22.07E(7)(b)2.a.ii. may be reduced to one three-sample set per quarter after one year of monitoring where no individual chlorite sample taken in the distribution system under 310 CMR 22.07E(7)(b)2.a.ii. has exceeded the chlorite MCL and the supplier has not been required to conduct monitoring under 310 CMR 22.07E(7)(b)2.b. The supplier may remain on the reduced monitoring schedule until either any of the three individual chlorite samples taken quarterly in the distribution system under 310 CMR 22.07E(b)2.a.ii. exceeds the chlorite MCL or the system is required to conduct monitoring under 310 CMR 22.07E(7)(b)2.b., at which time the supplier shall revert to routine monitoring.

3. Bromate.

a. Routine Monitoring. Community and non-transient non-community systems using ozone, for disinfection or oxidation, shall take one sample per month for each treatment plant in the system using ozone. Each supplier of water shall take samples monthly at the entrance to the distribution system while the ozonation system is operating under normal conditions.

b. Reduced Monitoring. Each supplier of water who is required to analyze for bromate may reduce monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/l based upon representative monthly bromide measurements for one year. The supplier may remain on reduced bromate monitoring until the running annual average source water bromide concentration, computed quarterly, is greater than or equal to 0.05 mg/l based upon representative monthly measurements. If the running annual average source water bromide concentration is > 0.05 mg/l, the supplier of water shall resume routine monitoring required by 310 CMR 22.07E(7)(b)3.a.

(c) Monitoring Requirements for Disinfectant Residuals.

1. Chlorine and Chloramines.

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a. Routine Monitoring. Community and nontransient noncommunity water systems that use chlorine or chloramines shall measure the residual disinfectant level in the distribution system at the same point in the distribution system and at the same time as total coliforms are sampled, as specified in 310 CMR 22.05. Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water may use the results of residual disinfectant concentration sampling conducted under 310 CMR 22.20A(5)(b)6. for unfiltered systems or 310 CMR 22.20A(5)(c)3. for systems which filter, in lieu of taking separate samples.

b. Reduced Monitoring. Monitoring may not be reduced.

2. Chlorine Dioxide.

a. Routine Monitoring. Community, nontransient noncommunity, and transient noncommunity water systems that use chlorine dioxide for disinfection or oxidation shall take daily samples at the entrance to the distribution system. For any daily sample that exceeds the MRDL, the supplier shall take samples in the distribution system the following day at the locations required by 310 CMR 22.07E(7)(c)2.b., in addition to the sample required at the entrance to the distribution system.

b. Additional Monitoring. On each day following a routine sample monitoring result that exceeds the MRDL, the supplier is required to take three chlorine dioxide distribution system samples. If chlorine dioxide or chloramines are used to maintain a disinfectant residual in the distribution system, or if chlorine is used to maintain a disinfectant residual in the distribution system and there are no disinfection addition points after the entrance to the distribution system (i.e., no booster chlorination), the supplier shall take three samples as close to the first customer as possible, at intervals of at least six hours. If chlorine is used to maintain a disinfectant residual in the distribution system and there are one or more disinfection addition points after the entrance to the distribution system (i.e., booster chlorination), the supplier shall take one sample at each of the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

c. Reduced Monitoring. Chlorine dioxide monitoring may not be reduced.

(d) Monitoring Requirements for Disinfection Byproduct Precursors (DBPP).

1. Routine Monitoring. Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water which use conventional filtration treatment (as defined in 310 CMR 22.02) shall monitor each treatment plant for TOC no later than the point of combined filter effluent turbidity monitoring and representative of the treated water. Each supplier of water required to monitor under 310 CMR 22.07E(7)(d)1. shall also monitor for TOC in the source water prior to any treatment at the same time as monitoring for TOC in the treated water. The source water TOC sample may be taken at an earlier time than the treated water TOC sample where the difference between the two sampling times is equal to the time it takes the water to pass through the treatment processes. These samples (source water and treated water) are referred to as paired samples. At the same time as the source water sample is taken, the supplier of water shall monitor for alkalinity in the source water prior to any treatment. Each supplier of water shall take one paired sample and one source water alkalinity sample per month per plant at a time representative of normal operating conditions and influent water quality.

2. Reduced Monitoring. Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water with an average treated water TOC of less than 2.0 mg/l for two consecutive years, or less than 1.0 mg/l for one year, may reduce monitoring for both TOC and alkalinity to one paired sample and one source water alkalinity sample per plant per quarter. The supplier of water shall revert to routine monitoring in the month following the quarter when the annual average treated water TOC is > 2.0 mg/l.

(e) Bromide. Each supplier of water who is required to analyze for bromate may reduce bromate monitoring from monthly to once per quarter, if the supplier of water demonstrates that the average source water bromide concentration is < 0.05 mg/l based upon representative monthly measurements for one year. The supplier of water shall continue bromide monitoring to remain on reduced bromate monitoring.

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(f) Monitoring Plans. Each supplier of water who is required to monitor under 310 CMR 22.07E shall develop and implement a monitoring plan. The supplier of water shall maintain the plan and make it available for inspection by the Department and the general public no later than 30 days following the applicable compliance dates in 310 CMR 22.07E(3). Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water that serves more than 3300 people shall submit a copy of the monitoring plan to the Department no later than the date of the first report required under 310 CMR 22.07E(9). The Department may also require the plan to be submitted by any other supplier. After review, the Department may require changes in any plan elements. The plan shall include at least the following elements.

1. Specific locations and schedules for collecting samples for any parameters included in 310 CMR 22.07E(7).
2. How the system will calculate compliance with MCLs, MRDLs, and treatment techniques.
3. If approved for monitoring as a consecutive system, or if providing water to a consecutive system, under the provisions of 310 CMR 22.12, the sampling plan shall reflect the entire distribution system.
4. Name, signature and title of system representative and date of signature.
5. System name and system PWSID No.

(8) Compliance Requirements:

(a) General Requirements.

1. Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system fails to monitor for TTHM, HAA5, or bromate, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average. Where compliance is based on a running annual average of monthly or quarterly samples or averages and the supplier's failure to monitor makes it impossible to determine compliance with MRDLs for chlorine and chloramines, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average.
2. All samples taken and analyzed under the provisions of 310 CMR 22.07E shall be included in determining compliance, even if that number is greater than the minimum required.
3. If, during the first year of monitoring under 310 CMR 22.07E(7), any individual quarter's average will cause the running annual average of that system to exceed the MCL, the system is out of compliance at the end of that quarter.

(b) Disinfection Byproducts.

1. TTHM and HAA5.

a. For each supplier of water monitoring quarterly, compliance with MCLs in 310 CMR 22.07E(1) shall be based on a running annual arithmetic average, computed quarterly, of quarterly arithmetic averages of all samples collected by the supplier as prescribed by 310 CMR 22.07E(7)(b)1.

b. For each supplier of water monitoring less frequently than quarterly, the supplier demonstrates MCL compliance if the average of samples taken that year under the provisions of 310 CMR 22.07E(7)(b)1. does not exceed the MCLs in 310 CMR 22.07E(1). If the average of these samples exceeds the MCL, the supplier shall increase monitoring to once per quarter per treatment plant and such a system is not in violation of the MCL until it has completed one year of quarterly monitoring, unless the result of fewer than four quarters of monitoring will cause the running annual average to exceed the MCL, in which case the supplier of water is in violation at the end of that quarter. Each supplier of water who is required to increase monitoring frequency to quarterly monitoring shall calculate compliance by including the sample which triggered the increased monitoring plus the following three quarters of monitoring.

c. If the running annual arithmetic average of quarterly averages covering any consecutive four-quarter period exceeds the MCL, the supplier of water is in violation of the MCL and shall notify the public pursuant to 310 CMR 22.16, in addition to reporting to the Department pursuant to 310 CMR 22.07E(9).

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d. If a supplier of water fails to complete four consecutive quarters of monitoring, compliance with the MCL for the last four-quarter compliance period shall be based on an average of the available data.

2. Bromate. Compliance shall be based on a running annual arithmetic average, computed quarterly, of monthly samples (or, for months in which the supplier of water takes more than one sample, the average of all samples taken during the month) collected by the supplier of water as prescribed by 310 CMR 22.07E(7)(b)3. If the average of samples covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and shall notify the public pursuant to 310 CMR 22.16, in addition to reporting to the Department pursuant to 310 CMR 22.07E(9). If a supplier of water fails to complete 12 consecutive months of monitoring, compliance with the MCL for the last four-quarter compliance period shall be based on an average of the available data.

3. Chlorite. Compliance shall be based on an arithmetic average of each three-sample set taken in the distribution system as prescribed by 310 CMR 22.07E(7)(b)2.a.ii. and 310 CMR 22.07E(7)(b)2.b. If the arithmetic average of any three-sample set exceeds the MCL, the supplier is in violation of the MCL and shall notify the public pursuant to 310 CMR 22.16, in addition to reporting to the Department pursuant to 310 CMR 22.07E(9).

(c) Disinfectant Residuals.

1. Chlorine and Chloramines.

a. Compliance shall be based on a running annual arithmetic average, computed quarterly, of monthly averages of all samples collected by the supplier of water under 310 CMR 22.07E(7)(c)1. If the average covering any consecutive four-quarter period exceeds the MRDL, the supplier is in violation of the MRDL and shall notify the public pursuant to 310 CMR 22.16, in addition to reporting to the Department pursuant to 310 CMR 22.07E(9).

b. In cases where the supplier of water switches between the use of chlorine and chloramines for residual disinfection during the year, compliance shall be determined by including together all monitoring results of both chlorine and chloramines in calculating compliance. Reports submitted pursuant to 310 CMR 22.07E(9) shall clearly indicate which residual disinfectant was analyzed for each sample.

2. Chlorine Dioxide.

a. Acute Violations. Compliance shall be based on consecutive daily samples collected by the system under 310 CMR 22.07E(7)(c)2. If any daily sample taken at the entrance to the distribution system exceeds the MRDL, and on the following day one (or more) of the three samples taken in the distribution system exceed the MRDL, the supplier is in violation of the MRDL and shall take immediate corrective action to lower the level of chlorine dioxide below the MRDL and shall notify the public pursuant to the procedures for acute health risks in 310 CMR 22.16 in addition to reporting to the Department pursuant to 310 CMR 22.07E(9). Failure to take samples in the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system will also be considered an MRDL violation and the supplier shall notify the public of the violation in accordance with the provisions for acute violations under 310 CMR 22.16 in addition to reporting to the Department pursuant to 310 CMR 22.07E(9).

b. Nonacute Violations. Compliance shall be based on consecutive daily samples collected by the supplier of water under 310 CMR 22.07E(7)(c)2. If any two consecutive daily samples taken at the entrance to the distribution system exceed the MRDL and all distribution system samples taken are below the MRDL, the supplier is in violation of the MRDL and shall take corrective action to lower the level of chlorine dioxide below the MRDL at the point of sampling and will notify the public pursuant to the procedures for nonacute health risks in 310 CMR 22.16 in addition to reporting to the Department pursuant to 310 CMR 22.07E(9). Failure to monitor at the entrance to the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system is also an MRDL

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violation and the supplier shall notify the public of the violation in accordance with the provisions for nonacute violations under 310 CMR 22.16 in addition to reporting to the Department pursuant to 310 CMR 22.07E(9).

(d) Disinfection Byproduct Precursors (DBPP). Compliance shall be determined as specified by 310 CMR 22.07E(10)(c). Each supplier of water may begin monitoring to determine whether Step 1 TOC removals can be met 12 months prior to the compliance date for the system. This monitoring is not required and failure to monitor during this period is not a violation. However, any supplier of water who does not monitor during this period, and then determines in the first 12 months after the compliance date that they are not able to meet the Step 1 requirements in 310 CMR 22.07E(10)(b)2. and shall therefore apply for alternate minimum TOC removal (Step 2) requirements, are not eligible for retroactive approval of alternate minimum TOC removal (Step 2) requirements as allowed pursuant to 310 CMR 22.07E(10)(b)3. and are in violation. A supplier of water may apply for alternate minimum TOC removal (Step 2) requirements any time after the compliance date. For each suppliers of water who is required to meet Step 1 TOC removals, if the value calculated under 310 CMR 22.07E(10)(c)1.d. is less than 1.00, the system is in violation of the treatment technique requirements and shall notify the public pursuant to 310 CMR 22.16, in addition to reporting to the Department pursuant to 310 CMR 22.07E(9).

(9) Reporting and Recordkeeping Requirements.

(a) Each supplier of water who is required to sample quarterly or more frequently shall report to the Department within ten days after the end of each quarter in which samples were collected, notwithstanding the provisions of 310 CMR 22.15. Each supplier of water who is required to sample less frequently than quarterly shall report to the Department within ten days after the end of each monitoring period in which samples were collected.

(b) Disinfection Byproducts. Each supplier of water shall report the information specified in the following table:

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If you are a...	You shall report...[1]
1. System monitoring for TTHM and HAA5 under the requirements of 310 CMR 22.07E(7)(b) on a quarterly or more frequent basis.	a. The number of samples taken during the last quarter. b. The location, date, and result of each sample taken during the last quarter. c. The arithmetic average of all samples taken in the last quarter. d. The annual arithmetic average of the quarterly arithmetic averages of 1.c. for the last four quarters. e. Whether, based on 310 CMR 22.07E(8)(b)1., the MCL was violated.
2. System monitoring for TTHM and HAA5 under the requirements of 310 CMR 22.07E(7)(b) less frequently than quarterly (but at least annually).	a. The number of samples taken during the last year. b. The location, date, and result of each sample taken during the last monitoring period. c. The arithmetic average of all samples taken over the last year. d. Whether, based on 310 CMR 22.07E(8)(b)1., the MCL was violated.
3. System monitoring for TTHM and HAA5 under the requirements of 310 CMR 22.07E(7)(b) less frequently than annually.	a. The location, date, and result of the last sample taken. b. Whether, based on 310 CMR 22.07E(8)(b)1., the MCL was violated.
4. System monitoring for chlorite under the requirements of 310 CMR 22.07E(7)(b)	a. The number of entry point samples taken each month for the last three months. b. The location, date, and result of each sample (both entry point and distribution system) taken during the last quarter. c. For each month in the reporting period, the arithmetic average of all samples taken in each three sample set taken in the distribution system. d. Whether, based on 310 CMR 22.07E(8)(b)3., the MCL was violated, in which month, and how many times it was violated each month.
5. System monitoring for bromate under the requirements of 310 CMR 22.07E(7)(b).	a. The number of samples taken during the last quarter. b. The location, date, and result of each sample taken during the last quarter. c. The arithmetic average of the monthly arithmetic averages of all samples taken in the last year. d. Whether, based on 310 CMR 22.07E(8)(b)2., the MCL was violated.

[1] The Department may choose to perform calculations and determine whether the MCL was violated.

(c) Disinfectants. Each supplier of water shall report the information specified in the following table:

If you are a...	You shall report...[1]
1. System monitoring for chlorine or chloramines under the requirements of 310 CMR 22.07E(7)(c).	a. The number of samples taken during each month of the last quarter. b. The monthly arithmetic average of all samples taken in each month for the last 12 months. c. The arithmetic average of the monthly averages for the last 12 months. d. Whether, based on 310 CMR 22.07E(8)(c)1., the MRDL was violated.
2. System monitoring for chlorine dioxide under the requirements of 310 CMR 22.07E(7)(c).	a. The dates, results, and locations of samples taken during the last quarter. b. Whether, based on 310 CMR 22.07E(8)(c)2., the MRDL was violated. c. Whether the MRDL was exceeded in any two consecutive daily samples and whether the resulting violation was acute or nonacute.

[1] The Department may choose to perform calculations and determine whether the MRDL was exceeded or violated.

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(d) Disinfection Byproduct Precursors and Enhanced Coagulation or Enhanced Softening. Each supplier of water shall report the information specified in the following table:

If you are a . . .	You shall report . . .[1]
1. System monitoring monthly or quarterly for TOC under the requirements of 310 CMR 22.07E(7)(d) and required to meet the enhanced coagulation or enhanced softening requirements in 310 CMR 22.07E(10)(b)2. or (b)3.	a. The number of paired (source water and treated water) samples taken during the last quarter. b. The location, date, and result of each paired sample and associated alkalinity taken during the last quarter. c. For each month in the reporting period that paired samples were taken, the arithmetic average of the percent reduction of TOC for each paired sample and the required TOC percent removal. d. Calculations for determining compliance with the TOC percent removal requirements, as provided in 310 CMR 22.07E(10)(c)1. e. Whether the system is in compliance with the enhanced coagulation or enhanced softening percent removal requirements in 310 CMR 22.07E(10)(b) for the last four quarters.
2. System monitoring monthly or quarterly for TOC under the requirements of Sec. 310 CMR 22.07E(7)(d) and meeting one or more of the alternative compliance criteria in 310 CMR 22.07E(10)(a)2. or (a)3.	a. The alternative compliance criterion that the system is using. b. The number of paired samples taken during the last quarter. c. The location, date, and result of each paired sample and associated alkalinity taken during the last quarter. d. The running annual arithmetic average based on monthly averages (or quarterly samples) of source water TOC for systems meeting a criterion in 310 CMR 22.07E(10)(a)2.a. or (a)2.c. or of treated water TOC for systems meeting the criterion in 310 CMR 22.07E(10)(a)2.b. e. The running annual arithmetic average based on monthly averages (or quarterly samples) of source water SUVA for systems meeting the criterion in 310 CMR 22.07E(10)(a)2.e. or of treated water SUVA for systems meeting the criterion in 310 CMR 22.07E(10)(a)2.f. f. The running annual average of source water alkalinity for systems meeting the criterion in 310 CMR 22.07E(10)(a)2.c. and of treated water alkalinity for systems meeting the criterion in 310 CMR 22.07E(10)(a)3.a. g. The running annual average for both TTHM and HAA5 for systems meeting the criterion in 310 CMR 22.07E(10)(a)2.c. or (a)2.d. h. The running annual average of the amount of magnesium hardness removal (as $CaCO_3$, in mg/l) for systems meeting the criterion in 310 CMR 22.07E(10)(a)3.b. i. Whether the system is in compliance with the particular alternative compliance criterion in 310 CMR 22.07E(10)(a)2. or (a)3.

[1] The Department may choose to perform calculations and determine whether the treatment technique was met.

(10) Treatment Technique for Control of Disinfection Byproduct (DBP) Precursors:

(a) Applicability.

1. Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water using conventional filtration treatment (as defined in 310 CMR 22.02) shall operate with enhanced coagulation or enhanced softening to achieve the TOC percent removal levels specified in 310 CMR 22.07E(10)(b) unless the supplier meets at least one of the alternative compliance criteria listed in 310 CMR 22.07E(10)(a)2. or (a)3.

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2. Alternative Compliance Criteria for Enhanced Coagulation and Enhanced Softening Systems. Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water using conventional filtration treatment may use the alternative compliance criteria in 310 CMR 22.07E(10)(a)2.a. through (a)2.f. to comply with 310 CMR 22.07E(10) in lieu of complying with 310 CMR 22.07E(10)(b). Each supplier of water shall still comply with monitoring requirements in 310 CMR 22.07E(7)(d).

a. The supplier's source water TOC level, measured according to 310 CMR 22.07E(6)(e)3., is less than 2.0 mg/l, calculated quarterly as a running annual average.

b. The supplier's treated water TOC level, measured according to 310 CMR 22.07E(6)(e)3., is less than 2.0 mg/l, calculated quarterly as a running annual average.

c. The supplier's source water TOC level, measured according to 310 CMR 22.07E(6)(e)3., is less than 4.0 mg/l, calculated quarterly as a running annual average; the source water alkalinity, measured according to 310 CMR 22.07E(6)(e)1., is greater than 60 mg/l (as $CaCO_3$), calculated quarterly as a running annual average; and either the TTHM and HAA5 running annual averages are no greater than 0.040 mg/l and 0.030 mg/l, respectively; or prior to the effective date for compliance in 310 CMR 22.07E(3), the supplier has made a clear and irrevocable financial commitment not later than the effective date for compliance in 310 CMR 22.07E(3), to use technologies that will limit the levels of TTHM and HAA5 to no more than 0.040 mg/l and 0.030 mg/l, respectively. The supplier of water shall submit evidence of a clear and irrevocable financial commitment, in addition to a schedule containing milestones and periodic progress reports for installation and operation of appropriate technologies, to the Department for approval not later than the effective date for compliance in 310 CMR 22.07E(3). These technologies shall be installed and operating not later than June 30, 2005. Failure to install and operate these technologies by the date in the approved schedule will constitute a violation of 310 CMR 22.00.

d. The TTHM and HAA5 running annual averages are no greater than 0.040 mg/l and 0.030 mg/l, respectively, and the system uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.

e. The supplier's source water SUVA, prior to any treatment and measured monthly according to 310 CMR 22.07E(6)(e)4, is less than or equal to 2.0 l/mg-m, calculated quarterly as a running annual average.

f. The supplier's finished water SUVA, measured monthly according to 310 CMR 22.07E(6)(e)4, is less than or equal to 2.0 l/mg-m, calculated quarterly as a running annual average.

3. Additional Alternative Compliance Criteria for Enhanced Softening Systems. Each supplier of water who practices enhanced softening who cannot achieve the TOC removals required by 310 CMR 22.07E(10)(b)2. may use the alternative compliance criteria in 310 CMR 22.07E(10)(a)3.a. and (a)3.b. in lieu of complying with 310 CMR 22.07E(10)(b). Each supplier of water shall still comply with monitoring requirements in 310 CMR 22.07E(7)(d).

a. Softening that results in lowering the treated water alkalinity to less than 60 mg/l (as $CaCO_3$), measured monthly according to 310 CMR 22.07E(6)(e)1. and calculated quarterly as a running annual average.

b. Softening that results in removing at least 10 mg/l of magnesium hardness (as $CaCO_3$), measured monthly and calculated quarterly as an annual running average.

(b) Enhanced Coagulation and Enhanced Softening Performance Requirements.

1. Each supplier of water shall achieve the percent reduction of TOC specified in 310 CMR 22.07E(10)(b)2. between the source water and the combined filter effluent, unless the Department approves the supplier's request for alternate minimum TOC removal (Step 2) requirements under 310 CMR 22.07E(10)(b)3.

2. Required Step 1 TOC reductions, indicated in the following table, are based upon specified source water parameters measured in accordance with 310 CMR 22.07E(6)(e). Each supplier of water who practices softening is required to meet the Step 1 TOC reductions in the far-right column (Source water alkalinity >120 mg/l) for the specified source water TOC:

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Step 1 Required Removal of TOC by Enhanced Coagulation and Enhanced Softening for Systems Using Surface Water or Groundwater Under the Direct Influence of Surface Water and Using Conventional Treatment[1,2]			
Source-water TOC, mg/l	Source-water alkalinity, mg/l as $CaCO_3$		
	0-60	> 60-120	> 120[3]
>2.0-4.0	35.0 %	25.0 %	15.0 %
>4.0-8.0	45.0 %	35.0 %	25.0 %
>8.0	50.0 %	40.0 %	30.0 %

[1] Systems meeting at least one of the conditions in 310 CMR 22.07E(10)(a)2. are not required to operate with enhanced coagulation.
[2] Softening systems meeting one of the alternative compliance criteria in 310 CMR 22.07E(10)(a)3. are not required to operate with enhanced softening.
[3] Systems practicing softening shall meet the TOC removal requirements in this column.

3. Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water using conventional treatment that cannot achieve the Step 1 TOC removals required by 310 CMR 22.07E(10)(b)2. due to water quality parameters or operational constraints shall apply to the Department, within three months of failure to achieve the TOC removals required by 310 CMR 22.07E(10)(b)2., for approval of alternative minimum TOC (Step 2) removal requirements. If the Department approves the alternative minimum TOC removal (Step 2) requirements, the Department may make those requirements retroactive for the purposes of determining compliance. Until the Department approves the alternate minimum TOC removal (Step 2) requirements, the supplier shall meet the Step 1 TOC removals contained in 310 CMR 22.07E(10)(b)2.

4. Alternate Minimum TOC Removal (Step 2) Requirements. Applications made to the Department by a supplier of water who practices enhanced coagulation for approval of alternate minimum TOC removal (Step 2) requirements under 310 CMR 22.07E(10)(b)3. shall include, at a minimum, results of bench- or pilot-scale testing conducted under 310 CMR 22.07E(10)(b)4.a. The submitted bench- or pilot-scale testing shall be used to determine the alternate enhanced coagulation level.

a. Alternate enhanced coagulation level is defined as coagulation at a coagulant dose and pH as determined by the method described in 310 CMR 22.07E(10)(b)4.a. through (b)4.e. such that an incremental addition of 10 mg/l of alum (or an equivalent amount of ferric salt) results in a TOC removal of ≤ 0.3 mg/l. The percent removal of TOC at this point on the "TOC removal versus coagulant dose" curve is then defined as the minimum TOC removal required for the system. After the Department approves this minimum requirement, it shall supersede the minimum TOC removal, which is required by the table in 310 CMR 22.07E(10)(b)2. This minimum requirement will be effective until such time as the Department approves a new value based on the results of a new bench- and pilot-scale test. Failure to achieve Department-set alternative minimum TOC removal levels is a violation of 310 MR 22.00.

b. The supplier of water shall conduct bench- or pilot-scale testing of enhanced coagulation using representative water samples and adding ten mg/l increments of alum (or equivalent amounts of ferric salt) until the pH is reduced to a level less than or equal to the enhanced coagulation Step 2 target pH shown in the following table:

Enhanced Coagulation Step 2 Target pH	
Alkalinity (mg/l as $CaCO_3$)	Target pH
0-60	5.5
>60-120	6.3
>120-240	7.0
>240	7.5

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c. For waters with alkalinities of less than 60 mg/l for which addition of small amounts of alum coagulant (or the equivalent addition of ferric salts) drives the pH below 5.5 before significant TOC removal occurs, the supplier of water shall add chemicals necessary to maintain the pH between 5.3 and 5.7 in samples until the TOC removal of 0.3 mg/l per 10 mg/l alum added (or an equivalent amount of ferric salt) is reached.

d. The supplier of water may operate the system at any coagulant dose or pH necessary (consistent with 310 CMR 22.00 requirements) to achieve the minimum TOC percent removal approved under 310 CMR 22.07E(10)(b)3.

e. If the TOC removal is consistently less than 0.3 mg/l of TOC per ten mg/l of incremental alum dose at all dosages of alum (or equivalent doses of ferric salt), the water will be deemed to contain TOC not amenable to enhanced coagulation. The supplier of water may then apply to the Department for a waiver of enhanced coagulation requirements.

(c) Compliance Calculations.

1. Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water other than those identified in 310 CMR 22.07E(10)(a)2. or (a)3. shall comply with requirements contained in 310 CMR 22.07E(10)(b)2. or (b)3. Each supplier of water shall calculate compliance quarterly, beginning after the system has collected 12 months of data, by determining an annual average using the following method:

a. Determine actual monthly TOC percent removal, equal to:

(1-(treated water TOC/source water TOC)) x 100

b. Determine the required monthly TOC percent removal (from either the table in 310 CMR 22.07E(10)(b)2. or from 310 CMR 22.07E(10)(b)3.).

c. Divide the value in 310 CMR 22.07E(10)(c)1.a. by the value in 310 CMR 22.07E(10)(c)1.b.

d. Add together the results of 310 CMR 22.07E(10)(c)1.c. for the last 12 months and divide by 12.

e. If the value calculated in 310 CMR 22.07E(10)(c)1.d. is less than 1.00, the supplier is not in compliance with the TOC percent removal requirements.

2. Each supplier of water may use the provisions in 310 CMR 22.07E(10)(c)2.a. through (c)2.e. in lieu of the calculations in 310 CMR 22.07E(10)(c)1.a. through (c)1.e to determine compliance with TOC percent removal requirements.

a. In any month that the supplier of water's treated or source water TOC level, measured according to 310 CMR 22.07E(6)(e)3., is less than 2.0 mg/l, the supplier may assign a monthly value of 1.0 (in lieu of the value calculated in 310 CMR 22.07E(10)(c)1.c.) when calculating compliance under the provisions of 310 CMR 22.07E(10)(c)1.

b. In any month that a supplier of water practicing softening removes at least 10 mg/l of magnesium hardness (as $CaCO_3$), the supplier may assign a monthly value of 1.0 (in lieu of the value calculated in 310 CMR 22.07E(10)(c)1.c.) when calculating compliance under the provisions of 310 CMR 22.07E(10)(c)1.

c. In any month that the supplier's source water SUVA, prior to any treatment and measured according to 310 CMR 22.07E(6)(e)4., is $\leq$ 2.0 l/mg-m, the supplier may assign a monthly value of 1.0 (in lieu of the value calculated in 310 CMR 22.07E(10)(c)1.c.) when calculating compliance under the provisions of 310 CMR 22.07E(10)(c)1.

d. In any month that the supplier of water's finished water SUVA, measured according to 310 CMR 22.07E(6)(e)4., is $\leq$ 2.0 l/mg-m, the supplier may assign a monthly value of 1.0 (in lieu of the value calculated in 310 CMR 22.07E(10)(c)1.c.) when calculating compliance under the provisions of 310 CMR 22.07E(10)(c)1.

e. In any month that a supplier of water practicing enhanced softening lowers alkalinity below 60 mg/l (as $CaCO_3$), the supplier may assign a monthly value of 1.0 (in lieu of the value calculated in 310 CMR 22.07E(10)(c)1.c.) when calculating compliance under the provisions of 310 CMR 22.07E(10)(c)1.

3. Each supplier of water who uses a surface water source or ground water source under the direct influence of surface water using conventional treatment may also comply with the requirements of 310 CMR 22.07E(10) by meeting the criteria in 310 CMR 22.07E(10)(a)2. or (a)3.

22.07E: continued

(d) Treatment Technique Requirements for DBP Precursors. The EPA Administrator identifies the following as treatment techniques to control the level of disinfection byproduct precursors in drinking water treatment and distribution systems: For a supplier of water who uses a surface water source or ground water source under the direct influence of surface water that uses conventional treatment, enhanced coagulation or enhanced softening.

22.08: Maximum Turbidity Contaminant Levels, Monitoring Requirements and Analytical Methods for Unfiltered Systems and for Filtered Systems Not in Compliance with 310 CMR 22.20A

(1) The maximum contaminant level for turbidity, applicable only to public water systems which use water obtained in whole or in any part from surface water sources, shall be measured at representative entry point(s) to the distribution system, and shall be:

(a) One turbidity unit, (1 NTU, Nephelometric turbidity unit) as determined by a monthly average rounded to the nearest significant whole number pursuant to 310 CMR 22.08(3) except that five or fewer turbidity units may be allowed if the supplier of water can demonstrate to the Department that the higher turbidity does not do any of the following:

1. Interfere with disinfection; or
2. Prevent maintenance of an effective disinfectant agent throughout the distribution system; or
3. Interfere with microbiological determinations.

(b) Five turbidity units, as determined by the arithmetic mean of two consecutive daily samples pursuant to 310 CMR 22.08(3).

(2) All analyses shall be conducted in accordance with the following methods:

(a) Nephelometric Method 2130B, "Standard Methods for the Examination of Water and Wastewater," American Public Health Association, 14th Edition, pages 132-4, inclusive; or

(b) Nephelometric Method, Method 180.1, "Methods in the Determination of Inorganic Substances in Environmental Samples" EPA-600/R-93-100, August 1995, Available at NTISPB94-121811.

(c) GLI Method 2, "Turbidity" November 2, 1992, Great Lakes Instrumentation, Inc., 8855 North 55th Street, Milwalkee, Wisconsin

(3) In no event shall the frequency of sampling be less than as set forth below:

(a) Community water systems subject to 310 CMR 22.08 shall commence sampling by not later than June 24, 1977 and shall take at least one sample per day thereafter. All samples shall be taken at representative entry point(s) to the distribution system.

(b) Non-community water systems subject to 310 CMR 22.08 shall commence sampling by not later than June 24, 1979 and shall take at least one sample per day thereafter. All samples shall be taken at representative entry point(s) to the distribution system.

(c) If the result of a turbidity analysis pursuant to 310 CMR 22.08(3)(a) and 22.08(3)(b) indicates that the maximum contaminant level has been exceeded, the sampling and measurement shall be confirmed by resampling as soon as practicable and preferably within one hour. If the repeat sample confirms that the maximum contaminant level has been exceeded, the supplier of water shall report to the Department by the end of the next business day. The repeat sample shall be the sample used for calculating the monthly average pursuant to 310 CMR 22.08(3)(a) and 22.08(3)(b). If the monthly average of the daily samples exceeds one turbidity unit, or if the average of two consecutive daily samples exceeds five turbidity units, the supplier of water shall notify the public pursuant to 310 CMR 22.16.

(d) If the Department determines that a reduced sampling frequency in a non-community system will not pose a risk to public health, it can reduce the required sampling frequency. The option of reducing the turbidity frequency shall be permitted only in those public water systems that practice disinfection and which maintain an active residual disinfectant in the distribution system, and in those cases where the Department has indicated in writing that no unreasonable risk to health existed under the circumstances of this option.

22.08: continued

(4) The requirements in 310 CMR 22.08 apply to unfiltered systems that the Department has determined in writing that filtration is required. The requirements in 310 CMR 22.08 also apply to filtered systems until such time that said systems are in compliance with 310 CMR 22.20A. The requirements for unfiltered systems that have met the criteria for avoiding filtration must comply with 310 CMR 22.20A.

22.09: Maximum Radionuclide Contaminant Levels, Monitoring Requirements and Analytical Methods

MCLs for Radionuclide Contaminants: The maximum contaminant level for combined radium-226 and radium-228, and gross alpha particle activity of 310 CMR 22.09 applies to all community water systems. The maximum contaminant level for beta particle and photon radioactivity of 310 CMR 22.09 applies to all community water systems using surface water sources in whole or in any part and serving more than 100,000 persons, and all other community water systems which the Department may designate. The MCL and monitoring requirements of 310 CMR 22.09 will be superseded by those described within 310 CMR 22.09A after December 8, 2003. After December 8, 2003, 310 CMR 22.09 is no longer applicable. Compliance with the reporting requirements for the Radionuclides under 310 CMR 22.09A is required on or after December 8, 2003.

(1) Radium-226, radium-228 and gross alpha particle radioactivity

(a) The maximum contaminant level shall be based on the analysis of an annual composite of four consecutive quarterly samples or the average of the analyses of four samples obtained at quarterly intervals. The required sensitivity of analyses shall be defined in terms of a detection limit. The detection limit shall be that concentration which can be counted with a precision of plus or minus 100% at the 95% confidence level (where 1.96 is the standard deviation of the net counting rate of the sample). The maximum contaminant level shall be

1. For combined radium-226 and radium-228, five pCi per liter. In no event shall the detection limit exceed one pCi per liter.

2. For gross alpha particle activity, including radium-226 but excluding radon and uranium, 15 pCi per liter. In no event shall the detection limit exceed three pCi per liter.

(b) Sampling and analysis shall be done as follows:

1. All samples shall be taken at the free flowing outlet of the ultimate user of the community water system, as approved by the Department. In addition, when so ordered by the Department, a community water system using two or more sources having different concentrations of radioactivity shall monitor source water. Each analysis shall be based on either an annual composite of four consecutive quarterly samples or the average of the analyses of four samples obtained at quarterly intervals. All data shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.

a. A gross alpha particle activity measurement may be substituted for the required radium-226 and radium-228 analysis, but only if the measured gross alpha particle activity does not exceed five pCi per liter at a confidence level of 95% (1.65 where is the standard deviation of the net counting rate of the sample). In localities where radium-228 may be present in drinking water, radium-226 and/or radium-228 analyses shall be required when the gross alpha particle activity exceeds two pCi per liter.

b. When the gross alpha particle activity exceeds five pCi per liter, the same or an equivalent sample shall be analyzed for radium-226. If the concentration of radium-226 exceeds three pCi per liter, the same or an equivalent sample shall be analyzed for radium-228.

2. The frequency of sampling shall in no event be less than as set forth below:

a. Community water systems shall begin initial sampling by no later than June 24, 1979 and shall complete such sampling by no later than June 24, 1980. At the discretion of the Department, data acquired after June 24, 1976 may be substituted for the initial analysis required herein.

b. Community water systems shall conduct repeat analyses at least once every four years. At the discretion of the Department when the initial analysis taken in

22.09: continued

conformance with 310 CMR 22.09(1)(b)2.a. has established that the average annual concentration is less than half the maximum contaminant level established by 310 CMR 22.09(1)(a), analysis of a single sample may be substituted for the quarterly sampling procedure otherwise required by 310 CMR 22.09(1)(b)1. More frequent monitoring than once every four years shall be conducted, when ordered by the Department, in the vicinity of mining or other operations which may contribute alpha particle radioactivity to either surface or ground water sources of drinking water. A community water system shall conduct an analysis pursuant to 310 CMR 22.09(1)(b)1. within one year of the introduction of a new water source for said system. More frequent monitoring shall be conducted when ordered by the Department in the event of possible contamination by radioactivity in finished water. If the average annual concentration of radium-228 has been assayed at least once using the quarterly sampling procedure required by 310 CMR 22.09 (1)(c)1., repeat monitoring after the initial analysis need not include radium-228, except when otherwise ordered by the Department. When so ordered by the Department, suppliers of water shall conduct annual monitoring of any community water system in which the radium-226 concentration exceeds three pCi per liter.

c. If the maximum contaminant level for gross alpha particle activity or total radium is exceeded, the community water system shall give notice to the Department pursuant to 310 CMR 22.15 and shall notify the public as required by 310 CMR 22.16. Monitoring at quarterly intervals shall be continued until the annual average concentration no longer exceeds the maximum contaminant level or until a monitoring schedule as a condition to a variance, exemption, or enforcement action shall become effective.

(2) For beta particle and photon radioactivity from man-made radionuclides

(a) The maximum contaminant level shall be the average annual concentration which produces an annual dose equivalent to the total body or any internal organ greater than four millirem per year. The concentration of tritium causing a four millirem per year dose equivalent in the total body shall be calculated on the basis of 20,000 pCi per liter. The concentration of strontium-90 causing a four millirem per year dose equivalent in the bone marrow shall be calculated on the basis of eight pCi per liter. The concentration of all other man-made radionuclides causing a four millirem per year total body or organ dose equivalents shall be calculated on the basis of a two liter per day drinking water intake using the 168 hour data listed in "Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure", NBS Handbook 69 as amended August 1963, U.S. Department of Commerce. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed four millirem per year. The maximum contaminant level shall be based on either analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. The required sensitivity of analyses shall be defined in terms of a detection limit. The detection limit shall be that concentration which can be counted with a precision of plus or minus 100% at the 95% confidence level (1.96 where is the standard deviation of the net counting rate of the sample). In no event shall the detection limit exceed

1. For tritium, 1,000 pCi per liter.
2. For strontium-89, 10 pCi per liter.
3. For strontium-90, 2 pCi per liter.
4. For iodine-131, 1 pCi per liter.
5. For cesium-134, 10 pCi per liter.
6. For gross beta, 4 pCi per liter.
7. For all other radionuclides, 1/10 of the applicable limit.

(b) Sampling and analysis shall be done as follows:

1. All samples shall be taken at the free flowing outlet of the ultimate user of the community water system, as approved by the Department. These sampling and analysis requirements shall apply to all community water systems using surface water sources in whole or in any part and serving more than 100,000 persons, and all other community water systems which the Department may designate. In addition, supplies of water shall

22.09: continued

conduct monitoring, as ordered by the Department to determine the concentration of man-made radioactivity in principal watersheds designated by the Department. Each analysis shall be based on either analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. All data shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question. If gross beta particle activity exceeds 50 pCi per liter, an analysis of the sample shall be performed to identify the major radioactive constituents present and the appropriate organ and total body doses shall be calculated to determine compliance with 310 CMR 22.09(2)(a).

2. The frequency of sampling shall in no event be less than as set forth below:

a. Except as provided in 310 CMR 22.09(2)(b)2.c., community water systems shall begin initial sampling by not later than June 24, 1979 and shall complete such sampling by not later than June 24, 1980. At the discretion of the Department, data acquired after June 24, 1976 may be substituted for the initial analysis required herein.

b. Except as provided in 310 CMR 22.09(2)(b)2.c., community water systems shall conduct repeat analyses at least once every four years. Compliance with 310 CMR 22.09(2)(a) may be assumed without repeat analysis if the average annual concentration of gross beta particle activity is less than 50 pCi per liter and if the average annual concentrations of tritium and strontium-90 are less than those prescribed in 310 CMR 22.09(2)(a), provided that if both tritium and strontium-90 are present the sum of their annual dose equivalents to bone marrow shall not exceed four millirem per year.

c. By not later than June 24, 1979 the supplier of water of any community water system designated by the Department as utilizing waters contaminated by effluent from nuclear facilities shall initiate quarterly monitoring for gross beta particle and iodine-131 radioactivity and annual monitoring for strontium-90 and tritium. Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples, or with the express written permission of the Department a composite of three monthly samples. If the gross beta particle activity in a sample exceeds 15 pCi per liter, the same or an equivalent sample shall be analyzed for strontium-89 and cesium-134. If the gross beta particle activity exceeds 50 pCi per liter, an analysis of the sample shall be performed to identify the major radioactive constituents present and the appropriate organ and total body doses shall be calculated to determine compliance with 310 CMR 22.09(2)(a). Quarterly monitoring for iodine-131 shall be based on a composite of five consecutive daily samples which shall be analyzed once each quarter. As ordered by the Department, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water. Annual monitoring for strontium-90 and for tritium shall be conducted by analysis of four quarterly samples, or with the express written permission of the Department a composite of four consecutive quarterly samples. The Department may in its discretion allow the substitution of environmental surveillance data taken in conjunction with a nuclear facility for direct monitoring of man-made radioactivity by the supplier of water where the Department determines such data is applicable to a particular community water system.

d. If any maximum contaminant level set forth in 310 CMR 22.09(2)(a) is exceeded, the community water system shall give notice to the Department pursuant to 310 CMR 22.15 and shall notify the public pursuant to 310 CMR 22.16. Monitoring at monthly intervals shall be continued until the concentration does not exceed the maximum contaminant level or until a monitoring schedule as a condition to a variance, exemption, or enforcement action shall become effective.

(3) EPA Analytical Methods for Radionuclide Contaminants: All analyses shall be made in accordance with the following methods

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ANALYTICAL METHODS FOR RADIONUCLIDE MONITORING

Contaminant	Methodology	Reference (method or page number)								
		EPA[1]	EPA[2]	EPA[3]	EPA[4]	SM[5]	ASTM[6]	USGS[7]	DOE[8]	Other
Naturally Occurring:										
Gross alpha & beta[11]	Evaporation	900	p 1	0	p 1	302, 7110 B		R–1120–76		
Gross alpha [11]	Co-precipitation			0		7110 C				
Radium 226	Radon emination	903.1	p 16	Ra-04	p 19	7500-Ra C305	D 3454–97	R–1141–76	Ra-04	N.Y. [9]
	Radiochemical	903.0	p 13	Ra-03		304, 7500-Ra B	D 2460–97	R–1140–76		
Radium 228	Radiochemical	903	p 24	Ra-05	p 19	7500-Ra D		R–1142–76		N.Y. [9] N.J. [10]
Uranium [12]	Radiochemical	908				7500-U B				
	Fluorometric	908				7500-U C (17th Ed.)	D 2907–97	R–1180–76	U-04	
								R–1181–76		
	Alpha spectronomy			00-07	p 33	7500-U C (18th, 19th, or 20th edition)	D 3972–97	R–1182–76	U-02	
	Laser phosphorimetry						D 5174–97			
Man-made:										
Radioactive cesium	Radiochemical	901.0	p 4			7500-Cs B	D 2459–72	R–1111–76		
	Gamma ray spectrometry	901.1			p 92	7120	D 3649–91	R–1110–76	4.5.2.3	
Radioactive iodine	Radiochemical	902.0	p 6			7500–1 B				
			p 9			7500–1 C	D 3649–91			
						7500–1 D				
	Gamma ray spectrometry	901.1			p 92	7120	D 4785–93		4.5.2.3	
Radioactive Strontium 89, 90	Radiochemical	905	p 29	Sr-04	p 65	303, 7500-Sr B		R–1160–76	Sr-01 Sr-02	
Tritium	Liquid scintillation	906	p 34	H-02	p 87	306,7500–3H B	D 4107–91	R–1171–76		
Gamma emmitters	Gamma ray spectrometry	901.1			p 92	7120	D 3649–91	R–1110–76	Ga-01	
		902.0				7500-Cs B	D 4785–93			
		901.1				7500-I B				

[1] ''Prescribed Procedures for Measurement of Radioactivity in Drinking Water,'' EPA 600/4–80–032, August 1980. Available at U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (Telephone 800–553–6847), PB 80–224744.

[2] ''Interim Radiochemical Methodology for Drinking Water,'' EPA 600/4–75–008 (revised), March 1976. Available at NTIS, ibid. PB 253258.

[3] ''Radiochemistry Procedures Manual'', EPA 520/5–84–006, December 1987. Available at NTIS, ibid. PB 84–215581.

[4] ''Radiochemical Analytical Procedures for Analysis of Environmental Samples,'' U.S. Department of Energy, March 1979. Available at NTIS, ibid. EMSL LV 053917.

[5] Standard Methods for the Examination of Water and Wastewater, 13th, 17th, 18th, 19th, or 20th editions, 1971, 1989, 1992, 1995 and 1998. Available at American Public Health Association, 1015 Fifteenth Street N.W., Washington, D.C. 20005. Methods 302, 303, 304, 305 and 306 are only in the 13th edition. Methods 7110B, 7500-Ra B, 7500-Ra C, 7500-Ra D, 7500-U B, 7500-Cs B, 7500-I B, 750–9I C, 7500–D, 7500-Sr B, 7500–3H B are in the 17th, 18th, 19th and 20th editions. Method 7110C is in the 18th, 19th and 20th editions. Method 7500-U C Fluorometric Uranium is only in the 17th Edition, and 7500-U C Alpha spectrometry is only in the 18th, 19th, and 20th editions. Method 7120 is only in the 19th and 20th editions. Methods 302, 303, 304, 305 and 306 are only in the 13th edition.

[6] Annual Book of ASTM Standards, Vol. 11.01 and 11.02, 1999 4; American Society for Testing and Materials; any year containing the cited version of the method may be used. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

[7] ''Methods for Determination of Radioactive Substances in Water and Fluvial Sediments,'' Chapter A5 in Book 5 of Techniques of Water-Resources Investigations of the United States Geo-logical Survey, 1977. Available at U.S. Geological Survey Information Services, Box 25286, Federal Center, Denver, CO 80225–0425.

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[8] ''EML Procedures Manual'', 27th Edition, (1990) or 28th Edition (1997), Volumes 1 and 2; either edition may be used. In the 27th edition Method Ra-04 is listed as Ra-05 and Method Ga-01-R is listed as Sect. 4.5.2.3. Available at the Environmental Measurements Laboratory, U.S. Department of Energy (DOE), 376 Hudson Street, New York, NY 10014–3621.

[9] ''Determination of Ra-226 and Ra-228 (Ra-02),'' January 1980; Revised June 1982. Available at Radiological Sciences Institute Center for Laboratories and Research, New York State Department of Health, Empire State Plaza, Albany, NY 12201.

[10] ''Determination of Radium 228 in Drinking Water,'' August 1980. Available at State of New Jersey, Department of Environmental Protection, Division of Environmental Quality, Bureau of Radiation and Inorganic Analytical Services, 9 Ewing Street, Trenton, NJ 08625.

[11] Natural uranium and thorium-230 are approved as gross alpha-particle activity calibration standards for the gross alpha co-precipitation and evaporation methods; americium-241 is approved for use with the gross alpha co-precipitation methods.

[12] If uranium (U) is determined by mass-type methods (*i.e.*, fluorometric or laser phosphorimetry), a 0.67 pCi/mg uranium conversion factor must be used. This conversion factor is conservative and is based on the 1:1 activity ratio of U-234 to U-238 that is characteristic of naturally-occurring uranium in rock.

22.09A: Maximum Radionuclide Contaminant Levels, Monitoring Requirements and Analytical Methods Effective as of December 8, 2003

(1) Maximum Contaminant Levels for Radionuclides: The maximum contaminant levels for radionuclide contaminants of 310 CMR 22.09A apply only to community water systems. The MCLs for radionuclides are as indicated in 310 CMR 22.09A: *Table A*:

TABLE A
MAXIMUM CONTAMINANT LEVELS FOR RADIONUCLIDES

Contaminant	MCL
Combined radium-226 and radium-228	5 pCi/L
Gross alpha particle activity (excluding radon and uranium)	15 pCi/L
Beta particle and photon radioactivity	4 mrem/year
Uranium	30 µg/L

(a) MCL for combined radium-226 and radium-228. The maximum contaminant level for combined radium-226 and radium-228 is 5 pCi/L. The combined radium-226 and radium-228 value is determined by the addition of the results of the analysis for radium-226 and the analysis for radium-228.

(b) MCL for gross alpha particle activity (excluding radon and uranium). The maximum contaminant level for gross alpha particle activity (including radium-226 but excluding radon and uranium) is 15 pCi/L.

(c) MCL for beta particle and photon radioactivity.

1. The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water must not produce an annual dose equivalent to the total body or any internal organ greater than four millirem/year (mrem/year).

2. Except for the radionuclides listed in 310 CMR 22.09A: *Table B*, the concentration of man-made radionuclides causing four mrem total body or organ dose equivalents must be calculated on the basis of two liter per day drinking water intake using the 168 hour data list in ''Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure,'' NBS (National Bureau of Standards) Handbook 69 as amended August 1963, U.S. Department of Commerce. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of this document are available from the National Technical Information Service, NTIS ADA 280 282, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800–553–6847. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW., Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed four mrem/year.

22.09A: continued

TABLE B AVERAGE ANNUAL CONCENTRATIONS ASSUMED TO PRODUCE: A TOTAL BODY OR ORGAN DOSE OF 4 MREM/YR		
Radionuclide	Critical organ	pCi/L
Tritium	Total body	20000
Strontium-90	Bone Marrow	8

(d) MCL for Uranium. The maximum contaminant level for uranium is 30 µg/L.

(e) Compliance Dates for Combined Radium-226 and 228, Gross Alpha Particle Activity, Gross Beta Particle and Photon Radioactivity, and Uranium.

1. Community water systems must comply with the MCLs listed in 310 CMR 22.09A(1): *Table A* beginning December 8, 2003 and compliance shall be determined in accordance with the requirements of 310 CMR 22.09A(1) and (5). Compliance with reporting requirements for the radionuclides under 310 CMR 22.09A is required beginning December 8, 2003.

(f) Best Available Technologies (BATs) for Radionuclides. The USEPA Administrator, pursuant to section 1412 of the federal Safe Drinking Water Act, has identified as indicated in 310 CMR 22.09A: *Table C*, *Table D*, and *Table E* of the best technology available for achieving compliance with the maximum contaminant levels for combined radium-226 and radium-228, uranium, gross alpha particle activity, and beta particle and photon radioactivity.

TABLE C
BAT FOR COMBINED RADIUM-226 AND RADIUM-228, URANIUM, GROSS ALPHA PARTICLE ACTIVITY, AND BETA PARTICLE PHOTON ACTIVITY

Contaminant	BAT
Combined radium-226 and radium-228	Ion exchange, reverse osmosis, lime softening.
Uranium	Ion exchange, reverse osmosis, lime softening, coagulation/filtration.
Gross alpha particle activity (excluding Radon and Uranium)	Reverse osmosis.
Beta particle and photon radioactivity	Ion exchange, reverse osmosis.

TABLE D
LIST OF SMALL SYSTEMS COMPLIANCE TECHNOLOGIES FOR RADIONUCLIDES AND LIMITATIONS TO USE

Unit technologies	Limitations (see foot-notes)	Operator skill level required. [1]	Raw water quality range and considerations.[1]
1. Ion exchange (IE)	([a])	Intermediate	All ground waters
2. Point of use (POU [2]) IE	([b])	Basic	All ground waters
3. Reverse osmosis (RO)	([c])	Advanced	Surface waters usually require pre-filtration
4. POU [2] RO	([b])	Basic	Surface waters usually require pre-filtration
5. Lime softening	([d])	Advanced	All waters
6. Green sand filtration	([e])	Basic	
7. Co-precipitation with Barium sulfate	([f])	Intermediate to Advanced	Ground waters with suitable water quality
8. Electrodialysis/electrodialysis reversal		Basic to Intermediate	All ground waters
9. Pre-formed hydrous Manganese oxide filtration.	([g])	Intermediate	All ground waters
10. Activated alumina	([a]), ([h])	Advanced	All ground waters; compet-ing anion concentrations may affect regeneration frequency
11. Enhanced coagulation/filtration	([i])	Advanced	Can treat a wide range of water qualities

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[1] National Research Council (NRC). Safe Water from Every Tap: Improving Water Service to Small Communities. National Academy Press. Washington, D.C. 1997.
[2] A POU, or ''point-of-use'' technology is a treatment device installed at a single tap used for the purpose of reducing contaminants in drinking water at that one tap. POU devices are typically installed at the kitchen tap. See the April 21, 2000 NODA for more details.
Limitations Footnotes: Technologies for Radionuclides:
[a] The regeneration solution contains high concentrations of the contaminant ions. Disposal options should be carefully considered before choosing this technology.
[b] When POU devices are used for compliance, programs for long-term operation, maintenance, and monitoring must be provided by water utility to ensure proper performance.
[c] Reject water disposal options should be carefully considered before choosing this technology. See other RO limitations described in the SWTR Compliance Technologies Table.
[d] The combination of variable source water quality and the complexity of the water chemistry involved may make this technology too complex for small surface water systems.
[e] Removal efficiencies can vary depending on water quality.
[f] This technology may be very limited in application to small systems. Since the process requires static mixing, detention basins, and filtration, it is most applicable to systems with sufficiently high sulfate levels that already have a suitable filtration treatment train in place.
[g] This technology is most applicable to small systems that already have filtration in place.
[h] Handling of chemicals required during regeneration and pH adjustment may be too difficult for small systems without an adequately trained operator.
[i] Assumes modification to a coagulation/filtration process already in place.

TABLE E
COMPLIANCE TECHNOLOGIES BY SYSTEM SIZE CATEGORY FOR RADIONUCLIDES

Contaminant	Compliance technologies [1] for system size categories (population served) 3,300–10,000		
	25–500	501–3,300	3300-10,000
1. Combined radium-226 and radium-228	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7. 8, 9
2. Gross alpha particle activity	3, 4	3, 4	3, 4
3. Beta particle activity and photon activity	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4
4. Uranium	1, 2, 4, 10, 11	1, 2, 3, 4, 5, 10, 11	1, 2, 3, 4, 5, 10, 11

Note: [1] Numbers correspond to those technologies found listed in 310 CMR 22.09A(1): *Table D.*

(2) Monitoring Frequency and Compliance Requirements for Radionuclides in Community Water Supplies.

(a) Monitoring Frequency and Compliance Requirements for Gross Alpha Particle Activity, Radium-226, Radium-228, and Uranium.

1. Community water systems must conduct initial monitoring to determine compliance with the maximum contaminant levels listed in 310 CMR 22.09A by December 31, 2007. For the purposes of monitoring for gross alpha particle activity, radium-226, radium-228, uranium, and beta particle and photon radioactivity in drinking water, "detection limit" is defined as in 310 CMR 22.09A(5)(b).

a. Applicability and sampling location for existing community water systems or sources. All existing community water systems using ground water, surface water or systems using both ground and surface water (for the purpose of 310 CMR 22.09A hereafter referred to as systems) must sample at every entry point to the distribution system that is representative of all sources being used (hereafter called a sampling point) under normal operating conditions. The system must take each sample at the same sampling point unless conditions make another sampling point more representative of each source or the Department has designated a distribution system location, in accordance with 310 CMR 22.09A(2)(b)2.

22.09A: continued

b. Applicability and sampling location for new community water systems or sources. All new community water systems or community water systems that use a new source of water must begin to conduct initial monitoring for the new source within the first quarter after initiating use of the source. Community water systems must conduct more frequent monitoring when ordered by the Department in the event of possible contamination or when changes in the distribution system or treatment processes occur which may increase the concentration of radioactivity in finished water.

(b) Initial Monitoring. The supplier of water must conduct initial monitoring for gross alpha particle activity, radium-226, radium-228, and uranium as follows:

1. Systems without acceptable historical data, as defined below, must collect four consecutive quarterly samples at all sampling points before December 31, 2007.

2. Grandfathering of data: The Department may allow historical monitoring data collected at a sampling point to satisfy the initial monitoring requirements for that sampling point, for the following situations.

a. To satisfy initial monitoring requirements, a community water system having only one entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.

b. To satisfy initial monitoring requirements, a community water system with multiple entry points and having appropriate historical monitoring data for each entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.

c. To satisfy initial monitoring requirements, a community water system with appropriate historical data for a representative point in the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003, provided that the Department finds that the historical data satisfactorily demonstrate that each entry point to the distribution system is expected to be in compliance based upon the historical data and reasonable assumptions about the variability of contaminant levels between entry points. The Department must make a written finding indicating how the data conforms to these requirements.

3. For gross alpha particle activity, uranium, radium-226, and radium-228 monitoring, the Department may waive the final two quarters of initial monitoring for a sampling point if the results of the samples from the previous two quarters are below the detection limit.

4. If the average of the initial monitoring results for a sampling point is above the MCL, the supplier of water must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are at or below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the Department.

(c) Reduced Monitoring. The Department may allow community water systems to reduce the future frequency of monitoring from once every three years to once every six or nine years at each sampling point, based on the following criteria.

1. If the average of the initial monitoring results for each contaminant (*i.e.* gross alpha particle activity, uranium, radium-226, or radium-228) is below the detection limit specified in 310 CMR 22.09A: *Table G*, the supplier of water must collect and analyze for that contaminant using at least one sample at that sampling point every nine years.

2. For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is at or above the detection limit but at or below ½ the MCL, the supplier of water must collect and analyze for that contaminant using at least one sample at that sampling point every six years. For combined radium-226 and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is at or above the detection limit but at or below ½ the MCL, the supplier of water must collect and analyze for that contaminant using at least one sample at that sampling point every six years.

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3. For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above ½ the MCL but at or below the MCL, the supplier of water must collect and analyze at least one sample at that sampling point every three years. For combined radium-226 and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is above ½ the MCL but at or below the MCL, the supplier of water must collect and analyze at least one sample at that sampling point every three years.

4. The supplier of water must use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods (*e.g.* if a system's sampling point is on a nine year monitoring period, and the sample result is above ½ the MCL, then the next monitoring period for that sampling point is three years).

5. If a supplier of water has a monitoring result that exceeds the MCL while on reduced monitoring, the system must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are below the MCL, unless the supplier of water enters into another schedule as part of a formal compliance agreement with the Department.

(d) Compositing. To fulfill quarterly monitoring requirements for gross alpha particle activity, radium-226, radium-228, or uranium, a supplier of water may composite up to four consecutive quarterly samples from a single entry point if analysis is done within a year of the first sample. The Department will treat analytical results from the composited sample as the average analytical result to determine compliance with the MCLs and the future monitoring frequency. If the analytical result from the composited sample is greater than ½ MCL, the Department may direct the supplier of water to take additional quarterly samples before allowing the supplier of water to sample under a reduced monitoring schedule.

(e) A gross alpha particle activity measurement may be substituted for the required radium-226 measurement provided that the measured gross alpha particle activity does not exceed 5 pCi/l. A gross alpha particle activity measurement may be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/l. The gross alpha measurement shall have a confidence interval of 95% (1.65s, where s is the standard deviation of the net counting rate of the sample) for radium-226 and uranium. When a supplier of water uses a gross alpha particle activity measurement in lieu of a radium-226 and/or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring frequency for radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, ½ the detection limit will be used to determine compliance and the future monitoring frequency.

(3) Monitoring and Compliance Requirements for Beta Particle and Photon Radioactivity. To determine compliance with the maximum contaminant levels in 310 CMR 22.09A: *Table A* for beta particle and photon radioactivity, a system must monitor at a frequency as follows:

(a) Community water systems (both surface and ground water) designated by the Department as vulnerable must sample for beta particle and photon radioactivity. The supplier of water must collect quarterly samples for beta emitters and annual samples for tritium and strontium-90 at each entry point to the distribution system (hereafter called a sampling point), beginning within one quarter after being notified by the Department. Systems already designated by the Department must continue to sample until the Department reviews and either reaffirms or removes the designation.

1. If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 50 pCi/L (screening level), the Department may reduce the frequency of monitoring at that sampling point to once every three years. The supplier of water must collect all samples required in 310 CMR 22.09A(3)(a) during the reduced monitoring period.

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2. For systems in the vicinity of a nuclear facility, the Department may allow the community water system to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the Department determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems which are using surveillance data must begin monitoring at the community water system's entry point(s) in accordance with 310 CMR 22.09A(3)(a).

(b) Community water systems (both surface and ground water) designated by the Department as utilizing waters contaminated by effluents from nuclear facilities must sample for beta particle and photon radioactivity. The supplier of water must collect quarterly samples for beta emitters and iodine-131 and annual samples for tritium and strontium-90 at each entry point to the distribution system (hereafter called a sampling point), beginning within one quarter after being notified by the Department. Systems already designated by the Department as systems using waters contaminated by effluents from nuclear facilities must continue to sample until the Department reviews and either reaffirms or removes the designation.

1. Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples or the analysis of a composite of three monthly samples. The former is recommended.

2. For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. As ordered by the Department, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water.

3. Annual monitoring for strontium-90 and tritium shall be conducted by means of the analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. The latter procedure is recommended.

4. If the gross beta particle activity beta minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 15 pCi/L, the Department may reduce the frequency of monitoring at that sampling point to every three years. The supplier of water must collect all samples required in 310 CMR 2.09A(3)(b) during the reduced monitoring period.

5. For systems in the vicinity of a nuclear facility, the Department may allow the community water system to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the Department determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems which are using surveillance data must begin monitoring at the community water system's entry point(s) in accordance with 310 CMR 22.09A(3)(b).

(c) Community water systems designated by the Department to monitor for beta particle and photon radioactivity can not apply to the Department for a waiver from the monitoring frequencies specified in 310 CMR 22.09A(3)(a) or 310 CMR 22.09A (3)(b).

(d) Community water systems may analyze for naturally occurring potassium-40 beta particle activity from the same or equivalent sample used for the gross beta particle activity analysis. The supplier of water is allowed to subtract the potassium-40 beta particle activity value from the total gross beta particle activity value to determine if the screening level is exceeded. The potassium-40 beta particle activity must be calculated by multiplying elemental potassium concentrations (in mg/L) by a factor of 0.82.

(e) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity exceeds the screening level, an analysis of the sample must be performed to identify the major radioactive constituents present in the sample and the appropriate doses must be calculated and summed to determine compliance with 310 CMR 22.09A(1)(c)1., using the formula in 310 CMR 22.09A(1(c)2. Doses must also be calculated and combined for measured levels of tritium and strontium to determine compliance.

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(f) The supplier of water must monitor monthly at the sampling point(s) which exceed the maximum contaminant level in 310 CMR 22.09A: *Table A* beginning the month after the exceedance occurs. The supplier of water must continue monthly monitoring until the system has established, by a rolling average of 3 monthly samples, that the MCL is being met. Systems who establish that the MCL is being met must return to quarterly monitoring until they meet the requirements set forth in 310 CMR 22.09A(3)(a)2. or 310 CMR 22.09A (3)(b)1.

(4) General Monitoring and Compliance Requirements for Radionuclides.

(a) The Department may require more frequent monitoring than specified in 310 CMR 22.09A(2) and 310 CMR 22.09A(3), or may require confirmation samples at its discretion. The results of the initial and confirmation samples will be averaged for use in compliance determinations.

(b) Each supplier of water shall monitor at the time designated by the Department during each compliance period.

(c) Compliance with 310 CMR 22.09A(1)(a) through 310 CMR 22.09A(1)(d) will be determined based on the analytical result(s) obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.

1. For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point. If the average of any sampling point is greater than the MCL, then the system is out of compliance with the MCL.
2. For systems monitoring more than once per year, if any sample result will cause the running average to exceed the MCL at any sample point, the system is out of compliance with the MCL immediately.
3. Each supplier of water must include all samples taken and analyzed under the provisions of 310 CMR 22.09A in determining compliance, even if that number is greater than the minimum required.
4. If a supplier of water does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance will be based on the running average of the samples collected.
5. If a sample result is less than the detection limit, zero will be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, ½ the detection limit will be used to calculate the annual average.

(d) The Department has the discretion to delete results of obvious sampling or analytic errors.

(e) If the MCL for radioactivity set forth in 310 CMR 22.09A(1)(a) through 310 CMR 22.09A(1)(d) is exceeded, the operator of a community water system must give notice to the Department pursuant to 310 CMR 22.15 and shall notify the public as required by 310 CMR 22.16.

(5) Analytical Methods for Radioactivity.

(a) Analysis for the following contaminants shall be conducted to determine compliance with 310 CMR 22.09A(1) in accordance with the methods in 310 CMR 22.09A: *Table F* or their equivalent as determined by USEPA.

22.09A: continued

TABLE F

ANALYTICAL METHODS FOR RADIONUCLIDE MONITORING

Contaminant	Methodology	Reference (method or page number)								
		EPA[1]	EPA[2]	EPA[3]	EPA[4]	SM[5]	ASTM[6]	USGS[7]	DOE[8]	Other
Naturally Occurring:										
Gross alpha & beta [11]	Evaporation	900	p 1	0	p 1	302, 7110 B		R–1120–76		
Gross alpha [11]	Co-precipitation			0		7110 C				
Radium 226	Radon emination	903.1	p 16	Ra-04	p 19	7500-Ra C	D 3454–97	R–1141–76	Ra-04	N.Y. [9]
	Radiochemical	903	p 13	Ra-03		304, 7500-Ra B	D 2460–97	R–1140–76		
Radium 228	Radiochemical	903.4	p 24	Ra-05	p 19	7500-Ra D		R–1142–76		N.Y. [9] N.J. [10]
Uranium [12]	Radiochemical	908				7500-U B				
	Fluorometric	908.1				7500-U C (17th Ed.)	D 2907–97	R–1180–76	U-04	
								R–1181–76		
	Alpha spectronomy			0	p 33	7500-U C (18th, 19th, or 20th edition)	D 3972–97	R–1182–76	U-02	
	Laser phosphorimetry						D 5174–97			
Man-made:										
Radioactive cesium	Radiochemical	901	p 4			7500-Cs B	D 2459–72	R–1111–76		
	Gamma ray spectrometry	901.1			p 92	7120	D 3649–91	R–1110–76	4.5.2.3	
Radioactive iodine	Radiochemical	902	p 6 p 9			7500–1 B 7500–1 C 7500–1 D	D 3649–91			
	Gamma ray spectrometry	901.1			p 92	7120	D 4785–93		4.5.2.3	
Radioactive Strontium 89, 90	Radiochemical	905	p 29	Sr-04	p 65	303, 7500-Sr B		R–1160–76	Sr-01 Sr-02	
Tritium	Liquid scintillation	906	p 34	H-02	p 87	306,7500–3H B	D 4107–91	R–1171–76		
Gamma emitters	Gamma ray spectrometry	901.1			p 92	7120	D 3649–91	R–1110–76	Ga-01-R	
		902				7500-Cs B	D 4785–88			
		901.1				7500-I B				

[1] ''Prescribed Procedures for Measurement of Radioactivity in Drinking Water,'' EPA 600/4–80–032 , August 1980. Available at U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (Telephone 800–553–6847), PB 80–224744.

[2] ''Interim Radiochemical Methodology for Drinking Water,'' EPA 600/4–75–008 (revised), March 1976. Available at NTIS, ibid. PB 253258.

[3] ''Radiochemistry Procedures Manual'', EPA 520/5–84–006, December 1987. Available at NTIS, ibid. PB 84–215581.

[4] ''Radiochemical Analytical Procedures for Analysis of Environmental Samples,'' U.S. Department of Energy, March 1979. Available at NTIS, ibid. EMSL LV 053917.

[5] Standard Methods for the Examination of Water and Wastewater, 13th, 17th, 18th, 19th, or 20th editions, 1971, 1989, 1992, 1995 and 1998. Available at American Public Health Association, 1015 Fifteenth Street N.W., Washington, D.C. 20005. Methods 302, 303, 304, 305 and 306 are only in the 13th edition. Methods 7110B, 7500-Ra B, 7500-Ra C, 7500-Ra D, 7500-U B, 7500-Cs B, 7500-I B, 7500–I C, 7500–I D, 7500-Sr B, 7500–3H B are in the 17th, 18th, 19th, and 20th editions. Method 7110C is in the 18th, 19th, and 20th editions. Method 7500-U C Fluorometric Uranium is only in the 17th Edition, and 7500-U C Alpha spectrom-etry is only in the 18th, 19th, and 20th editions. Method 7120 is only in the 19th and 20th editions. Methods 302, 303, 304, 305 and 306 are only in the 13th edition.

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[6] Annual Book of ASTM Standards, Vol. 11.01 and 11.02, 1994; American Society for Testing and Materials; any year containing the cited version of the method may be used. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428.
[7] ''Methods for Determination of Radioactive Substances in Water and Fluvial Sediments,'' Chapter A5 in Book 5 of Techniques of Water-Resources Investigations of the United States Geo-logical Survey, 1977. Available at U.S. Geological Survey Information Services, Box 25286, Federal Center, Denver, CO 80225–0425.
[8] ''EML Procedures Manual'', 27th Edition, Volume 1, 1990. Available at the Environmental Measurements Laboratory, U.S. Department of Energy (DOE), 376 Hudson Street, New York, NY 10014–3621.
[9] ''Determination of Ra-226 and Ra-228 (Ra-02),'' January 1980; Revised June 1982. Available at Radiological Sciences Institute Center for Laboratories and Research, New York State Department of Health, Empire State Plaza, Albany, NY 12201.
[10] ''Determination of Radium 228 in Drinking Water,'' August 1980. Available at State of New Jersey, Department of Environmental Protection, Division of Environmental Quality, Bureau of Radiation and Inorganic Analytical Services, 9 Ewing Street, Trenton, NJ 08625.
[11] Natural uranium and thorium-230 are approved as gross alpha-particle activity calibration standards for the gross alpha co-precipitation and evaporation methods; americium-241 is approved for use with the gross alpha co-precipitation methods.
[12] If uranium (U) is determined by mass-type methods (i.e., fluorometric or laser phosphorimetry), a 0.67 pCi/mg uranium conversion factor must be used. This conversion factor is conservative and is based on the 1:1 activity ratio of U-234 to U-238 that is characteristic of naturally-occurring uranium in rock.

(b) To determine compliance with 310 CMR 22.09A(1) the detection limit shall not exceed the concentrations as indicated in 310 CMR 22.09A *Table G*.

TABLE G
REQUIRED REGULATORY DETECTION LIMITS FOR VARIOUS RADIOCHEMICAL CONTAMINANTS

Contaminant	**Detection Limit (pCi/L)**
Gross alpha	3
Gross beta	4
Radium-226	1
Radium-228	1
Uranium	Reserved
Cesium-134	10
Strontium-89	10
Strontium-90	2
Iodine-131	1
Tritium	1000
Other radionuclides and Photon/Gamma Emmitters	$1/10^{th}$ of the rule

(c) To judge compliance with the maximum contaminant levels listed in 310 CMR 22.09A(1), averages of data shall be used and shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.

22.10: Alternative Analytical Methods

With the express written permission of the Department, given after a public hearing and the approval of the Administrator or the Administrator's designee, an alternate analytical technique may be employed for any analytical technical prescribed in 310 CMR 22.00. The Department shall give such permission only if the alternative technique is substantially equivalent to the prescribed test in both precision and accuracy as it relates to the determination of compliance with any maximum contaminant level. The use of the alternative analytical technique shall not decrease the frequency of monitoring required by 310 CMR 22.00.

22.11A: Laboratoy Certification

(1) No laboratory shall conduct the analyses of drinking water required by 310 CMR 22.00 nor report them to the supplier of water or to the Department for the purpose of complying with 310 CMR 22.00 unless the Department has certified the laboratory to conduct analytical measurements, pursuant to 310 CMR 42.00 except that measurements of turbidity, free chlorine residual, temperature, pH, alkalinity, calcium, conductors, orthophosphates, silica and other analyses for the control of treatment works for public water systems may be performed by any employee or agent of the public water system whom the Department designates as competent and authorized to perform such analyses. No sample shall be considered for the purpose of determining compliance with 310 CMR 22.00 if the sample was analyzed by a laboratory not certified pursuant to 310 CMR 42.00, or analyzed by an unapproved analytical method. All sample results submitted to the Department shall be on forms specified and approved by the Department. Certified laboratories, or other agents approved by the Department, shall provide collection containers of the recommended size, quality and construction for the collection of drinking water samples, as well as any required preservative.

(2) The Department may accept results of analyses performed by laboratories which are certified by the EP A. Such laboratories must continue to participate in performance evaluation studies and in laboratory intercomparison cross check studies which include the analyses for which the laboratory is certified or seeking certification.

22.11B: Public Water Systems Certified Operator Staffing Requirements

(1) Operation. Every public water system shall be operated at all times by a Primary and Secondary Operator for the treatment and distribution of drinking water, unless otherwise authorized in writing by the Department. Any public water system personnel who makes decisions regarding the system's process control or operational integrity shall be certified pursuant to 236 CMR 1.00 through 5.00. Exemptions to this requirement are addressed in 310 CMR 22.11B(5). The Primary Operator shall be directly responsible for the operation of a treatment facility and/or distribution system. The Secondary Operator shall be directly responsible for the operation of a treatment facility and/or distribution system or a major segment of the facility, during the temporary absence of the Primary Operator or during operational shifts when the Primary Operator is not scheduled to work.

NON-TEXT PAGE

22.11B: continued

Persons exercising official general administrative duties such as city engineers exercising engineering design duties, elected water commissioners, clerks or administrative workers involved in customer relations, billing, payroll, timekeeping, etc. shall not be considered directly responsible for a public water system, unless otherwise authorized in writing by the Department.

(2) Staffing Requirements. In order to ensure the proper management, operation and maintenance of a public water system, every public water system shall be operated as follows:

(a) Treatment - Primary Operator. A public water system utilizing treatment shall be operated for at least one daily working shift per work week by a certified operator who has a certification of grade level at least equal to the classification of the facility during the operation of the treatment facility, unless otherwise authorized in writing by the Department and/or as exempted by 310 CMR 22.11B(5).

(b) Treatment - Secondary Operator. A treatment facility requiring the treatment facility or filtration units to be operational for more than one working shift per work week, shall be operated by a certified operator who shall have a certification not less than one grade lower than the classification of the facility on all shifts when primary operator is not present, unless otherwise authorized in writing by the Department and/or as exempted by 310 CMR 22.11B(5).

(c) Distribution - Primary Operator. Public water systems having a water distribution system shall be operated by a certified operator who has a certification of grade level at least equal to the classification of the distribution portion of the system during at least one daily working shift per work week and shall be available to respond to emergencies within one hour at all other times, unless otherwise authorized in writing by the Department and/or as exempted by 310 CMR 22.11B(5).

(d) Distribution - Secondary Operator. Public water systems having a water distribution system, shall have a certified operator present during at least one daily working shift per work week to serve as the Primary Operator in his/her absence and shall have a certification not less than one grade lower than the classification of the system, unless otherwise authorized in writing by the Department and/or as exempted by 310 CMR 22.11B(5).

(3) Reporting Requirements. Except for periods of temporary absence, whenever a public water supply replaces a certified operator responsible for primary or secondary supervision under 310 CMR 22.11B(1), the public water system purveyor shall report the change to the Department within 24 hours and submit to the Department within 30 days documentation which outlines the procedures to obtain an appropriately certified operator(s). The new operator's name, certification number and duties shall be submitted to the Department once this information is known.

(4) Classification of Public Water Systems. Each public water system shall be classified by the Department in consultation with the Board of Certification of Operators of Drinking Water Supply Facilities as either VND (Water Vending Machines), VSS (Very Small Systems), Treatment (1T, 2T, 3T and 4T), Distribution (1D, 2D, 3D, and 4D). The increasing numerical class indicates an increasing complexity of operation and a higher level of training, knowledge, and experience required for operation. The certification grades for operators established in 236 CMR 3.02 and 3.04, shall correspond to the classification of the system as required under 310 CMR 22.11B(4).

(a) Rating Water Treatment Plants: The class of a public water system shall be established by adding together all rating values reflecting the complexity of operation for units which are present in the facility, as set forth in 310 CMR 22.11B.

1. A public water system using only disinfection does not need to rate the disinfection facility.
2. Each unit process should have points assigned only once. For example, a facility using oxidation, precipitation and filtration for iron removal, add ten points for the iron removal only and zero for filtration.
3. The overall rating of the public water system shall be based on the highest rated facility.

22.11B: continued

4. The point rating scale for a treatment facility is as follows:

Item	Points
a. Size of treatment facility (two to 20)	
i. Maximum system population served, peak day (one to ten)*	1pt/10,000
ii. Plant design flow average day or peak month's flow average day, whichever is larger (one to ten)* or part	1 pt/MGD
b. Water Supply source	
i. Groundwater	3
ii. Surface water	5
iii. Average raw water quality	(0 to 10)**
iv. Raw Water Quality (other than turbidity) varies enough to require treatment changes approximately 10% of the time:	2
v. Raw Water quality (turbidity) varies severely enough to require pronounced and/or very frequent treatment changes:	5
vi. Raw water quality subject to periodic serious industrial waste pollution:	10
c. Aeration	2
d. Packed tower aeration	6
e. pH adjustment	4
f. Stability or corrosion control	4
g. Taste and odor control	8
h. Color control	4
i. Iron or iron/manganese removal	10
j. Ion exchange softening	10
k. Chemical precipitation softening	20
l. Coagulant addition	4
m. Flocculation	6
n. Sedimentation	5
o. Upflow clarification	14
p. Filtration	10
q. Fluoridation	5
r. Disinfection (O to ten)***	
i. No disinfection	0
ii. Chlorination or comparable	5
iii. On-site generation of disinfectant	5
s. Special processes(including reverse osmosis electrodialysis)	15
t. Residuals/backwash water disposal	
i. No disposal to raw water source (e.g. to sewer or off watershed)	0
ii. Any disposal to raw water source(lagoons) (e.g. supernatant discharge to reservoir)	2
iii. Any disposal to plant raw water	5

*Maximum of 10 points

** The key concept is the variation or change in the quality of the raw water source with point values ranging from 0 to 10. Little or no variation: 0 Points, River source - 10 points.

*** For disinfectants, such as ozone, chloride dioxide or chloramines, assign 5 points for chlorination or comparable and 5 points for on-site generation of disinfectant.

5. Point System: Water treatment facilities shall be classified according to the following points system:

Class I-T 30 Points and less
Class II-T 31 to 55 points
Class III-T 56 to 75 points
Class IV-T 76 points and greater

22.11B: continued

(b) Water Vending Machines with Treatment. Free standing vending machines consisting of filters with the addition of chemicals and/or reverse osmosis system shall be classified as follows:

2000 gal per day and less	Class I-VNDT
2001 gal per day to 5000	Class II-VNDT
5001 gal per day to 50000	Class III-VNDT
50001 gal per day and grater	Class IV-VNDT

(c) Rating Distribution Systems: Distribution systems shall be rated according to the population served as follows except for non-community public water systems:

500 and less	VSS (Very Small System)
501 to 1,500	Class I-D
1,501 to 15,000	Class II-D
15,001 to 50,000	Class III-D
50,001 and greater	Class IV-D

All non-community water systems shall be classified as Very Small Systems (VSS) regardless of population served.

A disinfection process unaccompanied by any other treatment process is considered an integral part of the distribution system and is not rated as a treatment facility .

(d) Water Vending Machines without Treatment. Free standing vending machines consisting of filters, and/or ultra-violet disinfection systems with no chemical addition shall be classified as follows:

500 gal per day and less	VND-ID (Water Vending Machine)
501 gal per day and more	VND-IID

(e) Bulk or Bottled Water: Water that is treated to be distributed in bulk or as bottled water shall be classified as stated in 310 CMR 22.11B(4)(b) and (4)(d) unless otherwise authorized in writing by the Division.

(f) Specific Rating Values The Division may establish a rating value for any system or unit not shown on the table. The Division may change the classification of a particular facility when there are site-specific factors affecting the operation of the public water system or complexity of the treatment process. A public water system facility may be classified at a higher class at the discretion of the Division and after consultation with the Board of Certification of Operators of Drinking Water Supply Facilities.

(5) Exemptions : The Department may exempt any public water system from the requirements of 310 CMR 22.11B(1) and (2).

(a) The Department shall not grant any exemptions unless the Department finds all of the following:

1. Due to compelling factors the public water system is unable to comply with the requirements of 310 CMR 22.11B.
2. The granting of an exemption will not result in an unreasonable risk to health or impair the quality of water which is being delivered to the consumers.
3. The person or persons affiliated with the public water system can properly operate the system and detect any malfunctions in the operation of the treatment facility or distribution system in the absence of the primary operator.
4. The primary operator is able to respond to emergencies within a reasonable period of time. In no event shall an emergency response time greater than one hour be deemed reasonable.
5. That the Primary Operator is responsible for the operation of the system during his/her absence between scheduled visits and that the persons affiliated with the public water system are acting under the direction of the Primary Operator.

22.11B: continued

(b) Staffing and Comprehensive Operations Plan: Public water systems requesting an exemption under 310 CMR 22.11B(5) shall submit to the Division for review and approval a staffing and comprehensive operations plan for said system and/or facility.

(c) Part-time Operation. With the prior written approval of the Department, a public water systems classified as a 1D or 1T facility or less may reduce the staffing requirements of 310 CMR 22.11B(1) and (2) by operating the facility on a part-time basis. A public water system seeking a reduction in the staffing requirements shall be subject to the conditions listed at 310 CMR 22.11B(5)(a)1. through 5. and (5)(b). The Primary and Secondary Operators or both may be allowed to operate the treatment facility or distribution system on a part time basis.

(d) Water Treatment Facility - Automated Operations. Increased instrumentation, automation and (SCADA) systems may be used to reduce the number of on-site staff required during periods of routine operation. Public water system which have been designed for off-site monitoring may apply to the Department for exemption from the requirements of 310 CMR 22.11B(1) and (2). Design of treatment facilities utilizing automated controls must also meet the requirement specified in the guidelines and policies if appropriate.

1. The Department shall use, but not be limited to, the following factors in making its determination to evaluate whether a facility or system can reduce the number of staff required to operate a facility or system:
   a. the complexity and type of the treatment process,
   b. the size of storage tanks and clearwells,
   c. the time required to reduce water quality in the distribution system form a treatment process failure,
   d. the variability of source water quality,
   e. the degree of sophistication, reliability and control of the instrumentation monitoring and control system,
   f. the location of the off-site monitoring site with respect to operator travel time to the treatment facility,
   g. the adequacy of the written response plan at the off-site location when alarms or out-of-range parameters are reported by facility instrumentation,
   h. the capabilities of a system or facility to be remotely shut down during an alarm condition, and
   i. the arrangement of piping and storage facilities so that there will be at least 12 hours for the correction of a process malfunction before the distribution system is impacted by the malfunction, and
   j. the ability of improperly treated water to be voided from the water distribution system prior to the first customer without an interruption of water service.
2. The treatment facility or distribution system shall include, but not limited to, instrumentation to continuously measure the following variables:
   a. water storage tank levels at the treatment facility and on the distribution system,
   b. pH, conductivity, turbidity, chlorine residual, and selective ions,
   c. effluent turbidity levels,
   d. effluent chlorine residuals, and
   e. chemical storage tanks and disinfection equipment.
3. The treatment facility or distribution system shall include, but not limited to, alarms systems for the following:
   a. water storage tank high and low levels at the treatment facility and on the distribution system,
   b. pH, conductivity, turbidity, chlorine residual, disinfectant equipment, and selective ions within specific ranges,
   c. chlorine leaks and tank pressure changes,
   d. distribution system pressure loss, within specific ranges,
   e. fire and intrusion,
   f. power failures,
   g. critical pumps, motors and generators failures, and
   h. chemical tank shortage volumes (high and low levels).

(e) 4T Facilities: A treatment facility classified as a 4T and meeting the requirements of 310 CMR 22.11B(5)(d) shall be staffed as follows, with the exception of satellite or seasonal plants as described in 310 CMR 22.11B(7):

22.11B: continued

1. Treatment facilities operating 16 to 24 hours per day will be required to be staffed at a minimum of 16 hours per day during the days when the treatment facility and/or filtration units are in operation. The Primary Operator shall staff one work week shift.

2. Treatment facilities operating less than 16 hours per day will be required to be staffed at a minimum of eight hours per day during the days when the treatment facility and/or filtration units are in operation. The Primary Operator shall staff one work week shift.

(f) 3T Facilities: A treatment facility classified as a 3T and meeting the requirements of 310 CMR 22.11B(5)(d), with the exception of satellite or seasonal facility as described in 310 CMR 22.11B(7), shall be staffed at a minimum of eight hours per day during the days when the treatment facility and/or filtration units are in operation. The Primary Operator shall staff one work week shift.

(g) 2T Facility or Less: A treatment facility classified as a 2T or less and meeting the requirements of 310 CMR 22.11B(5)(d), with the exception of satellite or seasonal facilities as described in 310 CMR 22.11B(7) shall be staffed at minimum of four hours per day during the days when the treatment facility is in operation. The Primary Operator shall staff one work week shift.

(h) Slow Sand Filtration - Chemicals: A slow sand filtration process utilizing chemicals and meeting the requirements of 310 CMR 22.11B(5)(d) shall be staffed at a minimum of two hours per day during the days when the filtration process is in operation by the primary operator for one work week shift.

(i) Very Small Systems and Non Community Public Water Systems. A Secondary Operator is not required for public water systems classified as a very small system (VSS), non-community or non-transient non-community water systems. However, during the times when the Primary Operator is temporarily absent (*i.e.* absences not exceeding 30 days), a person who has a certification which corresponds to the class of the facility or higher shall be retained during the absence of the Primary Operator to respond in the event of an emergency. In no event shall an emergency response time greater than one hour be deemed reasonable.

(j) Slow Sand Filtration Non-Chemical: Slow sand filtration not utilizing chemicals may reduce the staffing requirements at 310 CMR 22.11B(1) and (2) by submitting to the Division a staffing and comprehensive operations plan for review and approval.

(k) River or Streams: No exemptions or waivers from 310 CMR 22.11B shall be granted for filtration facilities, other than slow sand filtration, which treat water drawn directly from rivers or streams. These facilities must be staffed at all time during the days when the filtration units are in operation.

(6) Contract Services With the prior written approval of the Department, public water systems may contract for the services of a certified operator to meet the requirements of 310 CMR 22.11B (1) and (2) provided that the public water system submit for the Department's approval a staffing and comprehensive operations plan in accordance with 310 CMR 22.11B(5)(b).

(7) Satellite or Seasonal Facility: Public water systems which have a staffed water treatment plant meeting the requirements of 310 CMR 22.11B and have one or more satellite or seasonal treatment facilities may with Departmental approval operate said facilities with remote control of key functions sufficiently to permit normally unstaffed operation of the satellite facility provided that said facilities comply with 310 CMR 22.11B(5)(d) and meets the requirements of the conditions listed at 310 CMR 22.11B(5)(a)1. through 5. and (5)(b). Facility maintenance, chemical deliveries and other actions requiring the physical presence of certified operators must be provided on the basis of the visits to the plant from the principal continuously staffed facility. Each satellite facility must be visited by a certified operator at least once per day to visual check and verify the instrumentation readings between the satellite or seasonable facility and local instrumentation and off-site instrumentation.

(8) Facility Verification: Before and after unstaffed operation periods, certified operators must check and confirm the validity and accuracy of data transmitted between the treatment facility and off-site location and make entry in the facility log of any malfunctions. Malfunctions must be corrected prior to further unstaffed operation of the treatment facility or distribution system.

22.12: Consecutive Public Water Systems

(1) When a public water system supplies water to one or more other consecutive public water systems, the Department may, based on a written request by the consecutive system, modify the monitoring requirements in 310 CMR 22.00 otherwise applicable to the consecutive system based on the extent that the interconnection of the system justifies treating them as a single system for monitoring purposes. Any modified monitoring shall be conducted pursuant to a written schedule approved by the Department.

(2) Any reduced monitoring plan approved by the Department pursuant to 310 CMR 22.12(1) will require a consecutive system to collect, at a minimum, the samples specified at 310 CMR 22.05, and monthly total coliform samples at each entry point to the distribution system.

22.13: Variances

The Department upon receipt of an application from the public water system, may grant variances from the requirements of 310 CMR 22.05 to 310 CMR 22.09, inclusive, but only subject to the following conditions:

(1) The Department may grant one or more variances to one or more public water systems
(a) which, because of characteristics of the raw water sources which are reasonably available to the system(s), cannot comply with a prescribed maximum contaminant level or levels despite application of the best technology, treatment techniques, or other means, which the Department finds are generally available, taking costs into consideration. The Department shall not grant a variance pursuant to 310 CMR 22.13(1)(a) unless the Department finds in consultation with the Massachusetts Department of Public Health that the variance will not result in an unreasonable risk to health. If the Department grants a public water system a variance pursuant to 310 CMR 22.13(1)(a) the Department shall prescribe within one year of the date the variance is granted, a schedule for:
1. Compliance, including increments of progress by the public water system with each maximum contaminant level requirement with respect to which the variance was granted, and
2. Implementation by the public water system of such control measures as the Department may require for each contaminant, subject to the maximum contaminant level requirement, during the period ending on the date compliance with such requirement is required.
(b) from any provision of 310 CMR 22.13 which requires the use of a specified treatment technique with respect to a contaminant if the public water system applying for the variance demonstrates to the satisfaction of the Department that such treatment technique is not necessary to protect the health of persons because of the nature of the raw water source of such system. A variance granted pursuant to 310 CMR 22.13(1)(b) shall be conditioned on such monitoring and other requirements as the Department may prescribe.

(2) Before the Department grants any variance, or prescribes any schedule pursuant to any variance, the Department shall give notice and opportunity for public hearing to the public, to the Massachusetts Department of Public Health, and to the Agency. A notice given pursuant to 310 CMR 22.13(2) may cover the granting of more than one variance or the prescribing of more than one schedule, and a hearing held pursuant to such notice shall include each of the variances and schedules covered by the notice.

(3) The Department shall not accept any application for a variance unless the public water system applying for the variance agrees in writing to all of the following:
(a) Pay in full the cost of all notices and hearings required by 310 CMR 22.13(2).
(b) Comply with any schedule prescribed pursuant to 310 CMR 22.13(1)(a) as expeditiously as possible;
(c) Comply with any monitoring or other requirement prescribed pursuant to 310 CMR 22.13(1)(b).
(d) Report to the Department, in the manner prescribed in 310 CMR 22.15, the results of all tests, measurements and analyses made in compliance with the variance, and with the schedule and/or monitoring requirements prescribed pursuant to the variance;

22.13: continued

(e) Report to the Department, in the manner prescribed in 310 CMR 22.15, any failure to comply with the terms of the variance, or with the schedule and/or monitoring requirements prescribed pursuant to the variance;

(f) Notify the public, in the manner prescribed in 310 CMR 22.16 of the granting of the variance;

(g) Notify the public, in the manner prescribed in 310 CMR 22.16 of any failure to comply with the variance or with any requirement of any schedule or monitoring requirement prescribed pursuant to the variance; and

(h) Maintain all the records prescribed in 310 CMR 22.17 in the manner prescribed in said 310 CMR 22.17.

(i) The system has the technical, managerial, and financial capacity to adhere to 310 CMR 22.04(3), as determined by the Department.

(4) Every variance issued by the Department shall be conditioned on compliance by the public water system with the requirements set forth in 310 CMR 22.13(3). Said requirements shall have the same force and effect they would have if specifically set forth in 310 CMR 22.00.

(5) The Department shall promptly report to the Administrator or to the Administrator's designee, every variance granted by the Department. Such notification shall contain all of the following:

(a) The reason for the variance;

(b) The basis for the Department's finding that the granting of the variance will not result in an unreasonable risk to health, in those cases where the Department must make such a finding before granting a variance; and

(c) Documentation of the need for the variance.

(6) All applications for variances shall be made on forms prescribed by the Department.

(7) Best Available Technologies for Organic Compounds:

(a) The following technologies listed in 310 CMR 22.13(7)(a)1. through (a)54. are identified by the EPA Administrator, pursuant to section 1415(a) (1)(A) of the federal Safe Drinking Water Act as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for organic chemicals as listed in 310 CMR 22.07A(1) and 22.07B(1).

22.13: continued

Best Available Technologies

Contaminant	PTA[1]	GAC[2]	OX[3]
1. Benzene	X	X	
2. Carbon tetrachloride	X	X	
3. 1,2-Dichloroethane	X	X	
4. Trichloroethylene	X	X	
5. para-Dichlorobenzene	X	X	
6. 1,1-Dichloroethylene	X	X	
7. 1,1,1-Trichloroethane	X	X	
8. Vinyl chloride	X		
9. cis-1,2-Dichloroethylene	X	X	
10. 1,2-Dichloropropane	X	X	
11. Ethylbenzene	X	X	
12. Monochlorobenzene	X	X	
13. o-Dichlorobenzene	X	X	
14. Styrene	X	X	
15. Tetrachloroethylene	X	X	
16. Toluene	X	X	
17. trans-1,2-Dichloroethylene	X	X	
18. Xylenes (total)	X	X	
19. Alachlor		X	
20. Aldicarb		X	
21. Aldicarb sulfoxide		X	
22. Aldicarb sulfone		X	
23. Atrazine		X	
24. Carbofuran		X	
25. Chlordane		X	
26. Dibromochloropropane	X	X	
27. 2,4-D		X	
28. Ethylene dibromide	X	X	
29. Heptachlor		X	
30. Heptachlor epoxide		X	
31. Lindane		X	
32. Methoxychlor		X	
33. PCBs		X	
34. Pentachlorophenol		X	
35. Toxaphene		X	
36. 2,4,5-TP		X	
37. Endrin		X	
38. Benzo(a)pyrene		X	
39. Dalapone		X	
40. Dichloromethane		X	
41. Di(2-ethylhex)adipate	X	X	
42. Di(2-ethylhexyl)phthalate		X	
43. Dinoseb		X	
44. Diquat		X	
45. Endothall		X	
46. Glphosate			X
47. Hexachlorobenzene		X	
48. Hexachlorocyclopentadiene	X	X	
49. Oxamyl		X	
50. Picloram		X	
51. Simazine		X	
52. 1,2,4-Trichlorobenzene	X	X	
53. 1,1,2-Trichloroethane	X	X	
54. 2,3,7,8-TCDD(Dioxin)		X	

22.13: continued

(b) BATs for Inorganic Compounds: The EPA Administrator, pursuant to section 1415(a)(1)(A) of the federal Safe Drinking Water Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for the inorganic contaminants listed in 310 CMR 22.13(7)(b):

BAT FOR INORGANIC CONTAMINANTS LISTED IN 310 CMR 22.06(2)

CHEMICAL NAME	BAT(s)
Antimony	2,7
Asbestos	2,3,8
Barium 5,6,7,9	
Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6[2],7
CHEMICAL NAME	BAT(s)
Cyanide	5,7,10
Mercury	2[1],4,6[1],7[1]
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2[3],6,7,9
Thallium	1,5

Key to BATs in Table

1 = Activated Alumina
2 = Coagulation/Filtration (Not BAT for Systems <500 service connections)
3 = Direct and Diatomite Filtration
4 = Granular Activated Carbon
5 = Ion ExchangeElectrodialysis
6 = Lime Softening (not BAT for systems <500 service connections)
7 = Reverse Osmosis
8 = Corrosion Control
9 = Electrodialysis
10 = Chlorine
11 = Ultraviolet

[1]BAT only if influent Hg concentrations $\leq$10 µg/l.
[2]BAT for Chromium III only
[3]BAT for Selenium IV only

(c) Requirement to Install BAT: The Department shall require community water systems and non-transient, non-community water systems to install and/or use any treatment method identified in 310 CMR 22.13(7)(a) and (b) as a condition for granting a variance except as provided in 310 CMR 22.13(7)(d). If, after the system's installation of the treatment method, the system cannot meet the MCL, that system shall be eligible for a variance under the provisions of 310 CMR 22.13.

(d) Engineering Assessment Option: If a system can demonstrate through comprehensive engineering assessments, which may include pilot plant studies, that the treatment methods identified in 310 CMR 22.13(7)(a) and (b) would only achieve a *de minimis* reduction in contaminants, the Department may issue a schedule of compliance that requires the system being granted the variance to examine other treatment methods as a condition of obtaining the variance.

(e) Compliance Schedule: If the Department determines that a treatment method identified in 310 CMR 22.13(7)(d) is technically feasible, the Department may require the system to install and/or use that treatment method in connection with a compliance schedule issued under the provisions of section 1415(a)(1)(A) of the Safe Drinking Water Act. The Department's determination shall be based upon studies by the system and other relevant information.

22.13: continued

(8) No variances from the requirements set forth in 310 CMR 22.20A are allowed.

(9) No variances from the maximum contaminant level for total coliforms in 310 CMR 22.05(8) are allowed except as specified at 310 CMR 22.05(10) and in accordance with the variance requirements and procedures set forth in 310 CMR 22.13.

22.13A Small System Variances

For compliance with a requirement specifying a maximum contaminant level or treatment technique contained in a 310 CMR 22.00,

(1) Size of Public Water System Eligible For A Small System Variance.
(a) The Department may grant a small system variance to a public water system serving:
1. 3,300 persons or fewer, or
2. more than 3,300 persons but fewer than 10,000 persons, with approval of the Administrator.
(b) In determining the number of persons served by the public water system, the Department or the Administrator, as applicable, will include in the number, all persons served by consecutive public water system. A small system variance granted to a public water system shall also apply to any consecutive public water system served by it.

(2) Small System Variances Availability.
(a) A small system variance is not available under 310 CMR 22.13A for a national primary drinking water regulation for a microbial contaminant (including a bacterium, virus, or other organism) or an indicator or treatment technique for a microbial contaminant.
(b) A small system variance under 310 CMR 22.13A is otherwise only available for compliance with the requirement specifying a maximum contaminant level or treatment technique for a contaminant with respect to which;
1. a national primary drinking water regulations was promulgated on or after January 1, 1986; and
2. the administrator has published a small system variance technology pursuant to Section 1412(b)(15) of the Federal Safe Drinking Water Act.

(3) Timing of a Small System Variance. No variance can be granted under 310 CMR 22.13A by the Department until the later of the following:
(a) 90 days after the Department proposes to grant the small system variance;
(b) If the Department is proposing to grant a small system variance to a public water system serving 3,300 or fewer persons and the Administrator objects to the small system variance, the date on which the Department makes the recommended modifications or responds in writing to each objection, or
(c) If the Department is proposing to grant a small system variance to a public water system serving a population more than 3,300 and fewer than 10,000 persons, the date the Administrator must approve or disapprove the variance within 90 days after it is submitted to the Administrator for review.

(4) Review of Small System Variance Applications.
(a) A public water system requesting a small system variance must provide accurate and correct information to the Department or the Administrator to issue a small system variance in accordance with 310 CMR 22.13A. The Department may assist a pubic water system in compiling information required for the Department or the Administrator to issue a small system variance in accordance with 310 CMR 22.13A.
(b) Based upon an application for a small system variance and other information, and before a small system variance may be proposed under 310 CMR 22.13A, the Department or the Administrator must find and document the following:
1. The small system is eligible for a small system variance pursuant to 310 CMR 22.13A(1) and 310 CMR 22.13A(2).

22.13A: continued

2. The small water system cannot afford to comply, in accordance with affordability criteria established by the Department, with the national primary drinking water regulations for which a small system variance is sought, including by:
   a. Treatment;
   b. Alternative sources of water supply
   c. Restructuring or consolidation changes, including ownership change and/or physical consolidation with another public water system; or
   d. Obtaining financial assistance pursuant to Drinking Water State Revolving Fund loan program, 310 CMR 45.00 or any other Federal or State program.
3. The small system meets the source water quality requirements for installing the small system variance technology developed by the Administrator pursuant to guidance published under section 1412(b)(15) of the Federal Safe Drinking Water Act.
4. The small system has the technical, managerial and financial capacity to install, operate and maintain the applicable small system variance technology in compliance with 310 CMR 22.04; and
5. The terms and conditions of the small system variance, as developed through compliance with 310 CMR 22.13A(5), ensure adequate protection of human health, considering the following:
   a. the quality of the source water for the public water system; and
   b. removal efficiencies and expected useful life of the small system variance technology.
6. The small system has the technical, managerial, and financial capacity to operate its system, as determined by the Department.

(5) Terms and Conditions. The terms and conditions of the small system variance shall include, at a minimum, the following requirements:

(a) proper and effective installation, operation and maintenance of the applicable small system variance technology in accordance with guidance published by the Administrator pursuant to section 1412(b)(15) of the Federal Safe Drinking Water Act, taking into consideration any relevant source water characteristics and any other site-specific conditions that may affect proper and effective operation and maintenance of the technology;

(b) monitoring requirement for the contaminant for which a small system variance is sought, as specified at 310 CMR 22.00; and

(c) any other terms or conditions that are necessary to ensure adequate protection of public health, which may include:
   1. Public education requirements; and
   2. Source water protection requirements.

(d) the Department or the Administrator shall establish a schedule for the public water system to comply with the terms and conditions of the small system variance which must include , at a minimum, the following requirements:
   1. increments of progress, such as milestone dates for the public water system to apply for financial assistance and begin capital improvements;
   2. quarterly reporting to the Department or Administrator, as applicable, of the public system's compliance with the terms and conditions of the small system variance;
   3. schedule for the Department or the Administrator to review the small system variance under 310 CMR 22.13A(5)(e); and
   4. compliance with the terms and conditions of the small system variance as soon as practicable but not later than 3 years after the date on which the small system variance is granted. The Administrator or the Department may allow up to two additional years in the Administrator of the Department determines that additional time is necessary for the public water system to;
      a. complete necessary capital improvements to comply with small system variance technology, secure an alternative source of water or restructure or consolidate; or
      b. obtain financial assistance provided pursuant to the Drinking Water State Revolving Funds loan program, 310 CMR 45.00 or any other Federal or state Program.

22.13A: continued

(e) The Department or the Administrator must review each small system variance granted not less often than everyfive years after the compliance date established in the small system variance to determine whether the public water system continues to meet the eligibility criteria and remains eligible for the small system variance and is complying with the terms and conditions of the small system variance. If the public water system would no longer be eligible for a small system variance, the Department or the Administrator must determine whether continuing the variance is in the public interest. If the Department or the Administrator finds that continuing the variance is not in the public interest, the variance shall be withdrawn.

(6) Public Participation.

(a) At least 15 days before the date of variance proposal, and at least 30 days prior to a public meeting to discuss the proposed small system variance, the small waster system as directed by the Department or Administrator, must provide notice to all persons served by the public water system. For billed customers, identified in 310 CMR 22.13A(6)(a)1., this notice must include the information listed in 310 CMR 22.13A(6)(c). For other persons regularly served by the system, identified in 310 CMR 22.13A(6)(a)2., the notice shall include the information identified in 310 CMR 22.13A(6)(d). Notice must be provided to all persons served by:

1. Direct mail or other home delivery to billed customers or other service connections, and
2. Any other method reasonable calculated to notify, in a brief and concise manner, other persons regularly served by the system. Such methods may include publication in a local newspaper, posting in public places or delivery to community organizations.

(b) At the time of proposal, the Department will publish a notice in the State Register or a newspaper or newspapers of wide circulation in the State, or in the case of the Administrator, in the Federal Register. This notice shall include the information listed in 310 CMR 22.13A(6)(c).

(c) The notice in 310 CMR 22.13A(6)(a)1. and (b) must include, at a minimum, the following:

1. Identification of the contaminant(s) for which a small system variance is sought;
2. A brief statement of the health effects associated with the contaminant(s) for which a small system variance is sought using the applicable language contained in Appendix M of the Drinking Water Program's Guidelines and Policies for Public Water Systems;
3. The address and telephone number at which interested persons may obtain further information concerning the contaminant and the small system variance;
4. A brief summary, in easy understandable terms, of the terms and conditions of the small system variance;
5. A description of the consumer petition process under 310 CMR 22.13A(8)(a) and information on contacting the EPA Regional Office:
6. A brief statement announcing the public meeting required under 310 CMR 22.13A(7)(a), including a statement of the purpose of the meeting, information regarding the time and location for the meeting, and the address and telephone number at which interested persons may obtain further information concerning the meeting; and
7. In communities with a large proportion of non-English-speaking residents, as determined by the Department, information in the appropriate language regarding the content and importance of the notice.

(d) The notice in 310 CMR 22.13A(6)(a)2. must provide sufficient information to alert readers to the proposed variance and direct them where to receive additional information.

(e) At its option, the Department or the Administrator may choose to issue separate notices or additional notices related to the proposed small system variance, provided that the requirements in 310 CMR 22.13A(5)(a) through (d) are satisfied.

(f) Prior to promulgating the final variance, the Department or the Administrator must respond in writing to all significant public comments received relating to the small system variance. Response to public comment and any other documentation supporting the issuance of a variance must be made available to the public after final promulgation.

22.13A: continued

(7) Public Meeting Requirements.

(a) The Department or the Administrator must provide for at least one public meeting on the small system variance no later than 15 days after the small system variance is proposed.

(b) At the time of the public meeting, the Department or Administrator must prepare and make publicly available, in addition to the information listed in 310 CMR 22.13A(6)(c), either;

1. The proposed small system variance, if the public meeting occurs after proposal of the small system variance; or

2. A draft of the proposed small system variance, if the public meeting occurs prior to proposal of the proposed small system variance.

3. Notice of the public meeting must be provided in the manner required under 310 CMR 22.13A(6) at least 30 days in advance of the public meeting. The notice shall be provided by the public water system, as directed by the Department or Administrator.

(8) Consumer Petition Process.

(a) Any person served by the small system may petition the Administrator to object to the granting of a small system variance within 30 days after the Department proposes to grant a small system variance for a public water system.

(b) The Administrator must respond to a petition filed by any person served by the small system and determine whether to object to the small system variance under 310 CMR 22.13A(9), no later than 60 days after the receipt of the petition.

(9) EPA Review and Approval of Small System Variances.

(a) At the time the Department proposes to grant a small system variance under 310 CMR 22.13A, the Department must submit to the Administrator the proposed small system variance and all supporting information, including any written public comments received prior to proposal.

(b) The Administrator may review and object to any proposed small system variance within 90 days of receipt of the proposed small system variance. The Administrator must notify the Department in writing of each basis for the objection and propose a modification to the small system variance to resolve the concerns of the Administrator. The Department must make the recommended modification, respond in writing to each objection, or withdraw the proposal to grant the small system variance.

(c) If the Department issues the small system variance without resolving the concerns of the Administrator, the Administrator may overturn the Department's decision to grant the variance if the Administrator determines the Department's decision does not comply with the Federal Safe Drinking Water Act, or 40 CFR Section 142.301 through 142.313.

(10) EPA action on a small system variance to a public water system serving a population of more then 3,300 and fewer than 10,000 persons.

(a) At the time the Department proposes to grant a small system variance to a small system serving a population of more than 3,300 and fewer than 10,000 persons, the Department must submit the proposed small system variance and all supporting information, including public comments received prior to proposal, to the Administrator.

(b) The Administrator must approve or disapprove the small system variance within 90 days of receipt of the proposed small system variance and supporting information. The Administrator must approve the small system variance if it meets each requirement within the Federal Safe Drinking Water Act, and 40 CFR 142.301 through 142.313.

(c) If the Administrator disapproves the small system variance, the Administrator must notify the Department in writing of the reasons for disapproval and the small system variance does not become effective. The Department may resubmit the small system variance for review and approval with modifications to address the objections stated by the Administrator.

22.14: Exemptions

The Department may upon receipt of an application, exempt any public water system from any maximum contaminant level prescribed in 310 CMR 22.06 through 310 CMR 22.09, or from any prescribed treatment technique, or from both, but only subject to the following conditions:

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(1) The Department shall not grant any exemption unless the Department finds all of the following:
(a) Due to compelling factors, which may include economic factors, the public water system is unable to comply with the maximum contaminant level requirement or the treatment technique requirement; or to implement measures to develop an alternative source of water supply;
(b) The public water system was in operation on the effective date of such maximum contaminant level requirement or treatment technique requirement; or for a public water system that was not in operation by that date, no reasonable alternative source of drinking water is available to such new public water system;
(c) The granting of the exemption will not result in an unreasonable risk to health. The Department shall make this finding in consultation with the Massachusetts Department of Public Health; and
(d) Management or restructuring changes (or both), as provided in 40 CFR, Safe Drinking Water Act, section 142.20(b)(1)(i), cannot reasonably be made that will result in compliance with the applicable Safe Drinking Water Act or, if compliance cannot be achieved, improve the quality of the drinking water.
(e) The system has the technical, managerial, and financial capacity to adhere to 310 CMR 22.04(3), as determined by the Department.

(2) No exemption shall be granted unless the public water system established that it is taking all practicable steps to meet the standards, and
(a) The public water system cannot meet the standard without capital improvements that cannot be completed prior to the date established pursuant to Section 1412(b)(10) of the Safe Drinking Water Act.
(b) In the case of a public water system which needs financial assistance for the necessary improvements, the public water system has entered into an agreement to obtain such financial assistance or assistance provided pursuant to the Drinking Water State Revolving Fund loan program, 310 CMR 45.00, or any other Federal or State Program that is reasonably likely to be available within the period of the exemption; or
(c) The public water system has entered into an enforceable agreement to become a part of a regional public water system.

(3) A public water system may not receive an exemption under 310 CMR 22.14, if the public water system was granted a variance under 310 CMR 22.13A

(4) A public water system may submit a joint request for exemptions when it seeks similar exemptions under similar circumstances.

(5) Any written request for an exemption or exemptions pursuant to 310 CMR 22.14, shall include the following information:
(a) The nature and duration of exemption requested.
(b) Relevant analytical results of water quality sampling of the system, including results of relevant tests conducted pursuant to the requirements of 310 CMR 22.00.
(c) Explanation of the compelling factors such as time or economic factors which prevent such system from achieving compliance.
(d) Other information, if any, believed by the applicant to be pertinent to the application.
(e) A proposed compliance schedule, including the date when each step toward compliance will be achieved.
(f) Such other information as the Department my require.

(6) The Department shall act on any exemption request submitted pursuant to 310 CMR 22.14 within 90 days of receipt of the request.

(7) In the Department's consideration of whether the public water system is unable to comply due to compelling factors pursuant to 310 CMR 22.14, the Department shall consider such factors as the following:
(a) Construction, installation, or modification of the treatment equipment or system.

22.14: continued

(b) The time needed to put into operation a new treatment facility to replace an existing system, this is not in compliance.
(c) Economic feasibility of compliance.

(8) If the Department decides to deny the application for an exemption, the Department shall notify the applicant in writing of the Department's intention to issue a denial. Such notice shall include a statement of reasons for the proposed denial, and shall offer the applicant an opportunity to present, within 30 days of receipt of the notice, additional information or argument in writing to the Department. The Department shall make a final determination on the request within 30 days after receiving any such additional written information or argument. If no additional information or argument is submitted by the applicant in writing to the Department, the application shall be denied.

(9) If the Department grants an exemption request submitted pursuant to 310 CMR 22.14, the Department shall notify the applicant of the Department's decision in writing. Such notice shall identify the facility covered, and shall specify the termination date of the exemption. Such notice shall provide that the exemption will be terminated when the system comes into compliance with the applicable regulation, and may be terminated upon a finding by the Department that the system has failed to comply with any requirements of the final schedule issued pursuant to 310 CMR 22.14.

(10) The Department shall propose a schedule for:
(a) Compliance, including increments of progress or measure to develop an alternative source of water supply, by the public water system with each maximum contaminant level requirement and treatment technique requirement with respect to which the exemption was granted, and
(b) Implementation by the public water system of such control measures, as the Department may require for each contaminant, subject to the maximum contaminant level requirement or treatment technique requirement, during the period ending on the date compliance with such requirement is required.

(11) The schedule shall be prescribed by the Department at the time the exemption is granted, in accordance with provision of opportunity for a hearing pursuant to 310 CMR 22.14(12).

(12) Before a schedule proposed by the Department pursuant to 310 CMR 22.14(11) may take effect the Department shall provide notice and opportunity for public hearing on the schedule.
(a) Public notice of an opportunity for hearing on an exemption schedule shall be circulated in a manner designed to inform interested and potentially interested persons of the proposed schedule, and shall include a least the following:
1. Posting of a notice in the principal post office of each municipality or area served by the public water system, and publishing of a notice in a newspaper or newspapers of general circulation in the area served by the public water system.
2. Mailing of a notice to the, the Massachusetts Department of Public Health, the local or regional public health agency in which the system is located and to other appropriate State or local agencies at the Department's discretion.
3. Such notices shall include a summary of the proposed schedule and shall inform interested persons that they may request a public hearing on the proposed schedule.
(b) Request for hearing may be submitted by any interested person. Frivolous or insubstantial request for hearing may be denied by the Department. Request must be submitted to the Department within 30 days after issuance of the public notices provided for in 310 CMR 22.14(5)(a). Such request shall include the following:
1. The name, address and telephone number of the individual, organization or other entity requesting a hearing;
2. A brief statement of the interest of the person making the request in the proposed schedule and of the information that the requesting person intends to submit at such hearing; and

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3. The signature of the individual making the request, or, if the request is made on behalf of an organization or other entity, the signature of a responsible official of the organization or other entity.

(c) The Department shall give notice in the manner set forth in 310 CMR 22.14(5)(a) of any hearing to be held pursuant to a request submitted by an interested person or on his own motion. Notice of the hearing shall also be sent to the person requesting the hearing, in any, Notice of the hearing shall include a statement of the purpose of the hearing, information regarding the time and location of the hearing, and the address and telephone number of an office at which interested persons may obtain further information concerning the hearing. All hearing location specified in the public notice shall be within the State. Notice of the hearing shall be given not less than 15 days prior to the time scheduled for the hearing.

(d) A hearing convened pursuant to 310 CMR 22.14(5)(d) shall be conducted before a hearing officer to be designated by the Department. The hearing shall be conducted by the hearing officer in an informal, orderly and expeditious manner. The hearing officer shall have authority to call witnesses, receive oral and written testimony and take such action as may be necessary to assure the fair and efficient conduct of the hearing. Following the conclusion of the hearing, the hearing officer shall forward the record of the hearing to the Department.

(13) A notice given pursuant to 310 CMR 22.14(12) may cover the granting of more than one exemption or the prescribing of more than one schedule, and a hearing held pursuant to such notice shall include each of the exemptions and schedules covered by the notice.

(14) Final Schedule. Within 30 days after the termination of the public hearing pursuant to 310 CMR 22.14(12), the Department shall, taking into consideration information obtained during such hearing, revise the proposed schedule as necessary and prescribe the final schedule for compliance and interim measures for the public water system granted an exemption under 310 CMR 22.14.

(15) The final schedule pursuant to 310 CMR 22.14(14) must require compliance with each contaminant level and treatment technique requirement with respect to which the exemption was granted as expeditiously as practicable but not later than three years after the otherwise applicable compliance date established in section 1412(b)(10) of the Federal Safe Drinking Water Act.

(16) Extension of Date for Compliance. In the case of a public water system which serves a population of not more than 3,300 persons and which needs financial assistance for the necessary improvements, an exemption granted under 310 CMR 22.14(1) or (2) may be renewed for one or more additional two-year periods, but not to exceed a total of six additional years, if the public water system established that the public water system is taking all practicable steps to meet the requirements of 310 CMR 22.14(2) and the established compliance schedule.

(17) The Department shall not accept any application for an exemption unless the public water system applying for the exemption agrees in writing to all of the following:

(a) Pay in full the cost of all notices and hearings required by 310 CMR 22.14(3);

(b) Comply with any schedule prescribed pursuant to 310 CMR 22.14(2) as expeditiously as possible, and in no event by later than the deadlines prescribed in 310 CMR 22.14(5);

(c) Report to the department, in the manner prescribed in 310 CMR 22.15, the results of all tests, measurements, and analyses made in compliance with the exemption, and with the schedule prescribed pursuant to the exemption;

(d) Report to the Department, in the manner prescribed in 310 CMR 22.15, any failure to comply with the terms of the exemption, or with the schedule prescribed pursuant to the exemption;

(e) Notify the public, in the manner prescribed in 310 CMR 22.16 of the granting of the exemption;

(f) Notify the public, in the manner prescribed in 310 CMR 22.16, of any failure to comply with the exemption or with any requirement of any schedule prescribed pursuant to the exemption;

22.14: continued

(g) Maintain all the records prescribed in 310 CMR 22.17 in the manner prescribed in 310 CMR 22.17.

(18) The Department shall promptly report to the Administrator or to the Administrator's designee every exemption granted by the Department. Such notification shall contain all of the following:

(a) The reason for the exemption;

(b) The basis for the Department's finding that the granting of the exemption will not result in an unreasonable risk to health; and

(c) Documentation of the need for the exemption.

(19) All applications for exemptions shall be made on forms prescribed by the Department.

(20) Exemptions from the requirements set forth at 310 CMR 22.06 and 22.07 will be granted only in accordance with Section 1416 of the federal Safe Drinking Water Act and 40 CFR 142.62.

(21) No exemptions from the requirements set forth in 310 CMR 22.20A(3)(a)3. and 310 CMR 22.20A(3)(b)2. to provide disinfection are allowed.

(22) No exemptions from the maximum contaminant level for total coliforms in 310 CMR 22.05(8) are allowed.

(23) Bottled Water, Point-of-Use, and Point of Entry Devices. The Department may require a public water system to use bottled water, point-of-use devices, point-of-entry devices as a condition of granting an exemption from the requirements of 310 CMR 22.06, 22.06B, 22.07A and 22.07B to avoid an unreasonable risk to health. The Department may require a public water system to use bottled water and point-of-use devices or other means, but not point of entry devices, as a condition for granting an exemption for corrosion control treatment required for lead and copper in 310 CMR 22.06B(2) and 22.06B(3) to avoid an unreasonable risk to health. The Department may require a public water system to use point-of-entry devices as a condition for granting an exemption from the source water treatment and lead service line replacement requirements for lead and copper under 310 CMR 22.06B(4) and 22.06B(5) to avoid an unreasonable risk to health.

(24) Public water systems using bottled water as a condition of obtaining an exemption from the requirements of 310 CMR 22.07B(1) and 310 CMR 22.07A, and 310 CMR 22.06(16) must meet the requirements in 310 CMR 22.14(25)

(25) Bottled Water. Public water systems that use bottled water as a condition for receiving a variance or an exemption from the requirements of 310 CMR 22.07B(1) and 22.07A(1) and 22.06(2) must meet the requirements specified in either 310 CMR 22.14(25)(a) or 22.14(25)(b) and 310 CMR 22.24(25)(c):

(a) Monitoring Program: The Department will require and approve a monitoring program for bottled water. The public water system must develop and put in place a monitoring program that provides reasonable assurances that the bottled water meets all MCLs. The public water system must monitor a representative sample of the bottled water for all contaminants regulated under 310 CMR 22.07B(1) and 22.07A(1) and 22.06(2) during the first three-month period that it supplies the bottled water to the public, and annually thereafter. Results of the monitoring program shall be provided to the Department annually.

(b) Certification: The public water system must receive a certification from the bottled water company that the bottled water supplied has been taken from an "approved source" as defined in 21 CFR 129.3(a); the bottled water company has conducted monitoring in accordance with 21 CFR 129.80(g)(1) through (3); and the bottled water does not exceed any MCLs or quality limits as set out in 21 CFR 103.35, 110, and 129. The public water system shall provide the certification to the Department the first quarter after it supplies bottled water and annually thereafter. At the Department's option a public water system may satisfy the requirements of 310 CMR 22.14(25) if an approved monitoring program is already in place in another State.

22.14: continued

(c) Responsibility: The public water system is fully responsible for the provision of sufficient quantities of bottled water to every person supplied by the public water system via door-to-door bottled water delivery.

(26) Public water systems that use point-of-use or point-of-entry devices as a condition of receiving an exemption must meet the requirements in 310 CMR 22.14(27).

(27) Public water systems that use point-of-use or point-of-entry devices as a condition for obtaining a variance or and exemption form 310 CMR 22.00 must meet the following requirements:

(a) It is the responsibility of the public water system to operate and maintain the point-of-use and/or point-of-entry treatment system.

(b) Before point-of-use or point-of-entry devices are installed, the public water system must obtain the approval of monitoring plan which ensures that the devices provided health protection equivalent to the provided by central water treatment.

(c) The public water system must apply effective technology under the Department approved plan. The microbiological safety of the water must be maintained at all times.

(d) The Department will require adequate certification of performance, filed testing, and, if not included the certification process, a rigorous engineering design review of the point-of-use and/or point-of-entry devices.

(e) The design and application of the point-of-use and/or point-of-entry devices must consider the potential for increasing concentrations of heterotrophic bacteria in water treated with activated carbon. It may be necessary to use frequent backwashing, post-contractor disinfection, and Heterotrophic Plant Count monitoring to ensure that the microbiological safety of the water is no compromised.

(f) point-of-use or point-of-entry devices that are properly installed, maintained, and monitored such that all consumers will be protected.

(g) In requiring the use of a point-of entry device as a condition of granting an exemption form the treatment requirement for lead and copper under 310 CMR 22.06B, the Department must be assured that use of the device will not cause increased corrosion of lead and copper bearing materials located between the devices and the tap that could increase contaminates levels at the tap.

22.15: General Reporting Requirements

(1) Except where a different reporting period is specified in 310 CMR 22.00, each supplier of water shall report to the Department within 48 hours every failure to comply with any of 310 CMR 22.15 applicable to the supplier of water, including failure to comply with any monitoring requirement applicable to the supplier of water pursuant to any of 310 CMR 22.00.

NITRATE REPORTING REQUIREMENTS: With regard to nitrate, a supplier of water shall notify the Department of Public Health and local public health authorities within 30 days of the date the public water system first learns of an analysis taken for purposes of 310 CMR 22.06 which indicates nitrate levels in excess of 10 mg/L.

(2) Unless a shorter reporting period is prescribed in 310 CMR 22.15(1) or in any other provision of 310 CMR 22.00, the supplier of water shall report to the Department the results of every test, measurement or analysis the supplier of water is required by 310 CMR 22.15 to make within

(a) the first ten days following the month in which the results are received or

(b) the first ten days following the end of the required monitoring period as stipulated by the Department, whichever of these is shorter.

(3) (a) The supplier of water is not required to report analytical results to the Department in cases where a Department laboratory performs the analysis.

(b) The supplier of water within ten days of completing the public notification requirements under 310 CMR 22.16 for the initial public notice and any repeat notices, shall submit to the Department and local Board of Health a certification that it has fully complied with the public notification regulations. The supplier of water shall include with this certification a representative copy of each type of notice distributed, published, posted, and made available to the persons served by the system and to the media.

22.15: continued

(c) When requested, the supplier of water shall submit to the Department within the time specified copies of any records required to be maintained under 310 CMR 22.15 or copies of any documents then in existence which the Department is entitled to inspect pursuant to 310 CMR 22.00.

(4) Chemical Addition: Every supplier of water shall report to the Department at least once each month the use of chemicals added to the water supply. Such reports shall include, but not be limited to, the name of the chemical, the amount added, the resulting concentration of the chemical in the water, and the reason for adding the chemical to the water.

(5) Annual Statistical Report: Every supplier of water shall report to the Department in January of each year on a form prescribed by the Department the amount of water that passes through their distribution systems during the preceding calendar year. Such reports shall include, at a minimum, the following:

(a) a monthly breakdown of the amount of water
1. purchased from other public water systems,
2. sold to other public water systems, and
3. sold or otherwise supplied to other consumers.

(b) an annual breakdown, to the extent known to the supplier of water, of the amount of water furnished during the year to each of the following classes of users:
1. residential users.
2. agricultural users.
3. commercial users.
4. industrial users.
5. other public water systems.
6. unaccounted for.

(c) Total number of users served by the system.

(d) Total number of days the system is operating during the calendar year.

(e) An annually updated emergency response plan.

(f) Names and Grades of Certified Operators.

(6) Reporting and Public Notification for Certain Unregulated Contaminants. A Community water system or non-transient, non-community water system required to monitor under 310 CMR 22.07C shall send to the Department any public notice required under 310 CMR 22.16 and two copies of such monitoring within 30 days of receipt of the analysis report unless 310 CMR 22.15(2) requires submission by an earlier date.

(7) All public water systems shall furnish the information requested by the Department, in a format specified by the Department, for each sample analyzed under 310 CMR 22.00 including:

(a) Results of all analytical methods, including negatives;

(b) Name and address of the system that supplied the sample;

(c) Contaminant(s);

(d) Analytical method(s) used;

(e) Date of sample;

(f) Date of analysis;

(g) Laboratory name and certification number.

(h) Method Detection Limits;

(i) Name of sample collector;

(j) QA/QC information, where applicable

(8) Notification of Imposition of Mandatory Water Use Restrictions and Local Drinking Water Health Advisory.

(a) All public water systems establishing a mandatory restriction on water use must notify the Department in writing within 14 days of its effective date. In its notice to the Department, the public water system establishing a mandatory restriction on water use shall include appropriate regulations, bylaws or ordinances establishing and imposing the restriction.

22.15: continued

(b) Public water systems establishing water use restrictions should consider requesting from the Department a declaration of a state of water supply emergency pursuant to M.G.L. c. 21G.

(c) Public water systems establishing a local drinking water health advisory shall notify the Department within 48 hours of its imposition, as well as notification to the Department within 48 hours of its termination.

22.16: Public Notification Requirements

(1) (a) Public Water Systems Required to Notify. Each supplier of water for a public water system (community water systems, non-transient non-community water systems, and transient non-community water systems) shall give notice for all violations of National Primary Drinking Water Regulations (NPDWR), Massachusetts Drinking Water Regulations and for other situations, as listed in table 1 or specified by the Department in writing. The term "violations" is used in 310 CMR 22.16 to include violations of the maximum contaminant level (MCL), maximum residual disinfection level (MRDL), treatment technique (TT), monitoring requirements, and testing procedures defined in 310 CMR 22.00 or specified by the Department in writing. Table 2 of 310 CMR 22.16 identifies the tier assignment for each specific violation or situation requiring a public notice.

310 CMR 22.16 - Table 1

Violation Categories and other Situations Requiring a Public Notice

1. Violations.
   a. Failure to comply with an applicable maximum contaminant level (MCL) or maximum residual disinfectant level (MRDL).
   b. Failure to comply with a prescribed treatment technique (TT).
   c. Failure to perform water quality monitoring, as required by 310 CMR 22.00.
   d. Failure to comply with testing procedures as prescribed by 310 CMR 22.00.
2. Variance and Exemptions under 310 CMR 22.13, 310 CMR 22.13A and 310 CMR 22.14
   a. Operation under a variance or an exemption.
   b. Failure to comply with the requirements of any schedule that has been set under a variance or an exemption.
3. Special Public Notices
   a. Occurrence of a waterborne disease outbreak or other waterborne emergency.
   b. Exceedance of the nitrate MCL by non-community water systems (NCWS), where granted permission by the Department under 310 CMR 22.13 and 310 CMR 22.13A.
   c. Exceedance of the secondary maximum contaminant level (SMCL) for fluoride.
   d. Availability of unregulated contaminant monitoring data.
   e. Other violations and situations determined by the Department to require a public notice under this section, not already listed in Table 1.

(b) Tier Classification. Public notice requirements are divided into three tiers, to take into account the seriousness of the violation or situation and of any potential adverse health effects that may be involved. The public notice requirements for each violation or situation listed in Table 1 of 310 CMR 22.16 are determined by the tier to which the violation is assigned. Table 2 of 310 CMR 22.16 provides the definition of each tier. 310 CMR 22.16: *Table 6* identifies the tier assignment for each specific violation or situation.

310 CMR 22.16 - Table 2

Definition of Public Notice Tiers

1. Tier 1 public notice--required for violations and situations with significant potential to have serious adverse effects on human health as a result of short-term exposure
2. Tier 2 public notice--required for all other violations and situations with potential to have serious adverse effects on human health.

22.16: continued

3. Tier 3 public notice--required for all other violations and situations not included in Tier 1 and Tier 2.

(c) Persons to be Notified.

1. Each supplier of water shall provide public notice to persons served by the water system, in accordance with 310 CMR 22.16. Public water systems that sell or otherwise provide drinking water to other public water systems (i.e., to consecutive systems) are required to give public notice to the owner/operator of the consecutive system; the consecutive system is responsible for providing public notice to the persons it serves.

2. If a public water system has a violation in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system, the Department may allow the system to limit distribution of the public notice to only persons served by that portion of the system which is out of compliance. Permission by the Department for limiting distribution of the notice shall be granted in writing.

3. A copy of the notice shall also be sent to the Department and the local Board of Health, in accordance with the requirements of 310 CMR 22.15(3)(b) and (3)(c).

(2) Tier 1 Public Notice.

(a) Violations or Situations Requiring Tier 1 Public Notice. Table 3 of 310 CMR 22.16 lists the violation categories and other situations requiring a Tier 1 public notice. Table 6 of 310 CMR 22.16 identifies the tier assignment for each specific violation or situation.

310 CMR 22.16 - Table 3

Violation Categories and Other Situations Requiring a Tier 1 Public Notice

1. Violation of the MCL for total coliforms when fecal coliform or *E. coli* are present in the water distribution system (as specified in 310 CMR 22.05(8)(b), or when the water system fails to test for fecal coliforms or E. coli when any repeat sample tests positive for coliform (as specified in 310 CMR 22.05).

2. Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite, as defined in 310 CMR 22.06, or when the water system fails to take a confirmation sample within 24 hours of the system's receipt of the first sample showing an exceedance of the nitrate or nitrite MCL, as specified in 310 CMR 22.06(9);

3. Exceedance of the nitrate MCL by non-community water systems, where permitted to exceed the MCL by the Department under 310 CMR 22.13, or 310 CMR 22.13A;

4. Violation of the MRDL for chlorine dioxide, as defined in 310 CMR 22.07E, when one or more samples taken in the distribution system the day following an exceedance of the MRDL at the entrance of the distribution system exceed the MRDL, or when the water system does not take the required samples in the distribution system, as specified in 310 CMR 22.07E;

5 Violation of the turbidity MCL under 310 CMR 22.08 and 310 CMR 22.20A, where the Department determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;

6. Violation of 310 CMR 22.20A, the Surface Water Treatment Rule (SWTR), or 310 CMR 22.20D, the Interim Enhanced Surface Water Treatment rule (IESWTR), or 310 CMR 22.20F, the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR), treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit (as identified in Table 6), where the Department determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;

7. Occurrence of a waterborne disease outbreak, as defined in 310 CMR 22.01(1), or other waterborne emergency such as:

a. a failure or significant interruption in key water treatment processes,

b. a natural disaster that disrupts the water supply or distribution system,

c. a chemical spill, or

d. an unexpected loading of possible pathogens into the source water that significantly increases the potential for drinking water contamination;

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8 Other violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the Department either in its regulations or on a case-by-case basis.

(b) Timeframe and Additional Requirements for Tier 1 Notification. Each suppler of water required to give Tier 1 notification shall:

1. Provide a public notice as soon as practical but no later than 24 hours after the suppler learns of the violation;
2. Initiate consultation with the Department as soon as practical, but no later than 24 hours after the supplier learns of the violation or situation, to determine additional public notice requirements; and
3. Comply with any additional public notification requirements (including any repeat notices or direction on the duration of the posted notices) that are established as a result of the consultation with the Department. Such requirements may include the timing, form, manner, frequency, and content of repeat notices (if any) and other actions designed to reach all persons served.

(c) Form and Manner of Public Notice. Each supplier of water shall provide the notice within 24 hours in a form and manner reasonably calculated to reach all persons served. The form and manner used by the supplier are to fit the specific situation, but shall be designed to reach residential, transient, and non-transient users of the water system and meet the minimum format requirements specified by the Department.

1. In order to reach all persons served, each supplier of water is required to use, at a minimum, one or more of the following forms of delivery:
   a. Appropriate broadcast media (such as radio and television);
   b. Posting of the notice in conspicuous locations throughout the area served by the water system;
   c. Hand delivery of the notice to persons served by the water system; or
   d. Another delivery method approved in writing by the Department.
2. Unless directed otherwise by the Department in writing, community water systems shall publish appropriate public notice within the local newspaper as a one day advertisement no later than 14 days after a Tier 1 violation. A copy of said notice shall be submitted to the Department no later than the time published.

(3) Tier 2 Public Notice:

(a) Violations or Situations Requiring Tier 2 Public Notice. Table 4 of 310 CMR 22.16 lists the violation categories and other situations requiring a Tier 2 public notice. Table 6 of 310 CMR 22.16 identifies the tier assignment for each specific violation or situation.

310 CMR 22.16 - Table 4

Violation Categories and Other Situations Requiring a Tier 2 Public Notice

1. All violations of the MCL, MRDL, and treatment technique requirements, except where a Tier 1 notice is required under 310 CMR 22.16(2)(a): *Table 3* or where the Department determines that a Tier 1 notice is required;
2. Violations of the monitoring and testing procedure requirements, where the Department determines that a Tier 2 rather than a Tier 3 public notice is required, taking into account potential health impacts and persistence of the violation; and
3. Failure to comply with the terms and conditions of any variance or exemption in place.

(b) Timeframe Required for Tier 2 Notification.

1. a. Each supplier of water shall provide the public notice as soon as practical, but no later than 30 days after the system learns of the violation.
   b. If the public notice is posted, the notice shall remain in place for as long as the violation or situation persists, but in no case for less than seven days, even if the violation or situation is resolved.
   c. The Department may, in appropriate circumstances, allow additional time for the initial notice of up to three months from the date the system learns of the violation. Extensions granted by the Department shall be in writing.

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2. a. Each supplier of water shall repeat the notice every three months as long as the violation or situation persists, unless the Department determines in writing that appropriate circumstances warrant a different repeat notice frequency.

b. In no circumstance may the repeat notice be given less frequently than once per year.

c. In no circumstance may the repeat notice for an MCL violation under 310 CMR 22.05, the Total Coliform Rule, or a treatment technique violation under 310 CMR 22.20A, the Surface Water Treatment Rule, or 310 CMR 22.20D, the Interim Enhanced Surface Water Treatment Rule, be reduced.

3. a. For the turbidity violations specified in Table 6 of 310 CMR 22.16, the supplier of water shall consult with the Department as soon as practical but no later than 24 hours after the public water system learns of the violation, to determine whether a Tier 1 public notice under 310 CMR 22.16(2)(a) Table 3 is required to protect public health.

b. When consultation does not take place within the 24-hour period, the water system shall distribute a Tier 1 notice of the violation within the next 24 hours (i.e., no later than 48 hours after the system learns of the violation), following the requirements under 310 CMR 22.16(2)(b) and (c).

c. Consultation with the Department is required for:

(i) Violation of the turbidity MCL under 310 CMR 22.08 and 310 CMR 22.20A; or

(ii) Violation of 310 CMR 22.20A, 310 CMR 22.20D, or 310 CMR 22.20F treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit.

(c) Form and Manner of Public Notice. Each supplier of water shall provide the initial public notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it shall at a minimum meet the following requirements:

1. Unless directed otherwise by the Department in writing, community water systems shall provide notice by:

a. Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

b. Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in 310 CMR 22.16(3)(c)1.a. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include: Publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places served by the system or on the Internet; or delivery to community organizations.

2. Unless directed otherwise by the Department in writing, the owner/operator of a non-community water systems shall provide notice by:

a. Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and

b. Any other method reasonably calculated to reach other persons served by the system if they would not normally be reached by the notice required in 310 CMR 22.16(3)(c)2.a. Such persons may include those served who may not see a posted notice because the posted notice is not in a location they routinely pass by. Other methods may include: Publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or, delivery of multiple copies in central locations (*e.g.*, community centers).

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(4) Tier 3 Public Notice:

(a) Violations or Situations Requiring Tier 3 Public Notice. 310 CMR 22.16: *Table 5* lists the violation categories and other situations requiring a Tier 3 public notice. 310 CMR 22.16: *Table 6* identifies the tier assignment for each specific violation or situation.

310 CMR 22.16 - Table 5

Violation Categories and Other Situations Requiring a Tier 3 Public Notice

1. Monitoring violations under 310 CMR 22.00, except where a Tier 1 notice is required under 310 CMR 22.16(2) or where the Department determines that a Tier 2 notice is required;
2. Failure to comply with a testing procedure established in 310 CMR 22.00, except where a Tier 1 notice is required under 310 CMR 22.16(2) or where the Department determines that a Tier 2 notice is required;
3. Operation under a variance granted under 310 CMR 22.13, 310 CMR 22.13A or an exemption granted under 310 CMR 22.14;
4. Availability of unregulated contaminant monitoring results, as required under 310 CMR 22.07C; and
5. Exceedance of the fluoride secondary maximum contaminant level (SMCL), as required under 310 CMR 22.06C.

(b) Timeframe Required for Tier 3 Notification.

1. a. Unless otherwise determined by the Department, each supplier of water shall provide the public notice not later than one year after the public water system learns of the violation or situation or begins operating under a variance or exemption.

b. Following the initial notice, the supplier shall repeat the notice annually for as long as the violation, variance, exemption, or other situation persists.

c. If the public notice is posted, the notice shall remain in place for as long as the violation, variance, exemption, or other situation persists, but in no case less than seven days (even if the violation or situation is resolved).

2. If approved by the Department under 310 CMR 22.16(4)(b)1., instead of individual Tier 3 public notices, a supplier of water may use an annual report detailing all violations and situations that occurred during the previous twelve months, as long as the timing requirements of 310 CMR 22.16(4)(b)1. are met and the format is approved by the Department.

(c) Form and Manner of Public Notice. Each supplier of water who is required to give Tier 3 notice shall provide the initial public notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it shall at a minimum meet the following requirements:

1. Unless directed otherwise by the Department in writing, the owner/operator of a community water systems shall provide notice by:

a. Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

b. Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in 310 CMR 22.16(4)(c)1.a. Other persons may include those who do not pay water bills or do not have service connection addresses (*e.g.*, house renters, apartment dwellers, university students, nursing home patients, prison inmates, *etc.*). Other methods may include: Publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (*e.g.*, apartment building owners or large private employers); posting in public places served by the system or on the Internet; or delivery to community organizations.

2. Unless directed otherwise by the Department in writing, the owner/operator of a non-community water systems shall provide notice by:

a. Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and

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b. Any other method reasonably calculated to reach other persons served by the system if they would not normally be reached by the notice required in 310 CMR 22.16(4)(c)2.a. Other persons may include those served who may not see a posted notice because the posted notice is not in a location they routinely pass by. Other methods may include: Publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or, delivery of multiple copies in central locations (e.g., community centers).

(d) If approved by the Department, the supplier of water may use the Consumer Confidence Report (CCR) required under 310 CMR 22.16A as a vehicle for the initial Tier 3 public notice and all required repeat notices, as long as:

1. The CCR is provided to persons served no later than 12 months after the system learns of the violation or situation as required under 310 CMR 22.16(4)(b);

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2. The Tier 3 notice contained in the CCR follows the content requirements under 310 CMR 22.16(5); and
3. The CCR is distributed following the delivery requirements under 310 CMR 22.16(4)(c)1.

(5) Public Notice Content.

(a) When a supplier of water violates 310 CMR 22.00 or has a situation requiring public notification, each public notice shall include the following elements:

1. Public water system name, public water system identification number (PWSID#)
2. A description of the violation or situation, including the contaminant(s) of concern, and (as applicable) the contaminant level(s);
3. When the violation or situation occurred;
4. Any potential adverse health effects from the violation or situation, including the standard language under 310 CMR 22.16(5)(d)1 or (d)2, whichever is applicable.
5. The population at risk, including subpopulations particularly vulnerable if exposed to the contaminant in their drinking water;
6. Whether alternative water supplies should be used;
7. What actions consumers should take, including when they should seek medical help, if known;
8. What the system is doing to correct the violation or situation;
9. When the water system expects to return to compliance or resolve the situation;
10. The name, business address, and phone number of the water system owner, operator, or designee of the public water system as a source of additional information concerning the notice; and
11. A statement to encourage the notice recipient to distribute the public notice to other persons served, using the standard language under 310 CMR 22.16(5)(d)3., where applicable.

(b) Public Notice Requirements for Systems Operating under a Variance or Exemption.

1. If a supplier o water has been granted a variance or an exemption, the public notice shall contain:
   a. An explanation of the reasons for the variance or exemption;
   b. The date on which the variance or exemption was issued;
   c. A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption; and
   d. A notice of any opportunity for public input in the review of the variance or exemption.
2. If a supplier of water violates the conditions of a variance or exemption, the public notice shall contain the eleven elements listed in 310 CMR 22.16(5)(a).

(c) Public Notice Presentation.

1. Each public notice required by 310 CMR 22.16(5):
   a. Shall be displayed in a conspicuous way when printed or posted;
   b. Shall not contain overly technical language or very small print;
   c. Shall not be formatted in a way that defeats the purpose of the notice;
   d. Shall not contain language which nullifies the purpose of the notice.
2. Multilingual requirements:
   a. For a supplier of water serving a large proportion of non-English speaking consumers, as determined in 310 CMR 22.16A, the public notice shall contain information in the appropriate language(s) regarding the importance of the notice or contain a telephone number or address where persons served may contact the water system to obtain a translated copy of the notice or to request assistance in the appropriate language.
   b. In cases where the Department has not determined what constitutes a large proportion of non-English speaking consumers, the supplier of water shall include in the public notice the same information as in 310 CMR 22.16(5)(c)2.a., where appropriate to reach a large proportion of non-English speaking persons served by the water system.

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(d) Standard Language:

1. Standard health effects language for MCL or MRDL violations, treatment technique violations, and violations of the condition of a variance or exemption. Each supplier of water shall include in each public notice the health effects language specified in Table 7 of 310 CMR 22.16 corresponding to each MCL, MRDL, and treatment technique violation listed in Table 6 of 310 CMR 22.16, and for each violation of a condition of a variance or exemption. Standard language for monitoring and testing procedure violations. Each supplier of water shall include the following language in their notice, including the language necessary to fill in the blanks, for all monitoring testing procedure violations listed in Table 6 of 310 CMR 22.16:

> "We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During [compliance period], we "did not monitor or test" or "did not complete all monitoring or testing" for [contaminant(s)], and therefore cannot be sure of the quality of your drinking water during that time".

2. Standard language to encourage the distribution of the public notice to all persons served. Each supplier of water shall include in their notice the following language (where applicable):

> "Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail".

(6) Notice to New Billing Units or New Customers.

(a) The owner/operator of a community water systems shall give a copy of the most recent public notice for any continuing violation, the existence of a variance or exemption, or other ongoing situations requiring a public notice to all new billing units or new customers prior to or at the time service begins.

(b) The owner/operator of a non-community water systems shall continuously post the public notice in conspicuous locations as specified by the Department in order to inform new consumers of any continuing violation, variance or exemption, or other situation requiring a public notice for as long as the violation, variance, exemption, or other situation persists.

(7) Special Notice of the Availability of Unregulated Contaminant Monitoring Results.

(a) The owner or operator of a community water system or non-transient non-community water system required to monitor 310 CMR 22.07C shall notify persons served by the system of the availability of the results of such sampling no later than 12 months after the monitoring results are known.

(b) The form and manner of the public notice shall follow the requirements for a Tier 3 public notice prescribed in 310 CMR 22.16(4)(c), 310 CMR 22.16(4)(d)1 and 310 CMR 22.16(4)(d)3. The notice shall also identify a person and provide the telephone number to contact for information on the monitoring results.

(8) Special Notice for Exceedance of the SMCL for Fluoride.

(a) The owner/operator of a community water systems that exceed the fluoride secondary maximum contaminant level (SMCL) of two mg/l as specified in 310 CMR 22.06C (determined by the last single sample taken in accordance with 310 CMR 22.06(6)(h), but do not exceed the maximum contaminant level (MCL) of four mg/l for fluoride (as specified in 310 CMR 22.06(4)1., shall provide the public notice in 310 CMR 22.16(8)(c) to persons served. Public notice shall be provided as soon as practical but no later than 12 months from the day the supplier of water learns of the exceedance. A copy of the notice shall also be sent to all new billing units and new customers at the time service begins and to the Massachusetts Department of Public Health. The supplier of water shall repeat the notice at least annually for as long as the SMCL is exceeded. If the public notice is posted, the notice shall remain in place for as long as the SMCL is exceeded, but in no case less than seven days (even if the exceedance is eliminated). On a case-by-case basis, the Department may require an initial notice sooner than 12 months and repeat notices more frequently than annually.

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(b) The form and manner of the public notice (including repeat notices) shall follow the requirements for a Tier 3 public notice in 310 CMR 22.16(4)(d)3.

(c) The notice shall contain the following language, including the language necessary to fill in the blanks:

> "This is an alert about your drinking water and a cosmetic dental problem that might affect children under nine years of age. At low levels, fluoride can help prevent cavities, but children drinking water containing more than two milligrams per liter (mg/l) of fluoride may develop cosmetic discoloration of their permanent teeth (dental fluorosis). The drinking water provided by your community water system [name] has a fluoride concentration of [insert value] mg/l.
>
> Dental fluorosis, in its moderate or severe forms, may result in a brown staining and/or pitting of the permanent teeth. This problem occurs only in developing teeth, before they erupt from the gums. Children under nine should be provided with alternative sources of drinking water or water that has been treated to remove the fluoride to avoid the possibility of staining and pitting of their permanent teeth. You may also want to contact your dentist about proper use by young children of fluoride-containing products. Older children and adults may safely drink the water.
>
> Drinking water containing more than four mg/L of fluoride (the U.S. Environmental Protection Agency's drinking water standard) can increase your risk of developing bone disease. Your drinking water does not contain more than four mg/l of fluoride, but we're required to notify you when we discover that the fluoride levels in your drinking water exceed two mg/l because of this cosmetic dental problem.
>
> For more information, please call [name of water system contact] of [name of community water system] at [phone number]. Some home water treatment units are also available to remove fluoride from drinking water. To learn more about available home water treatment units, you may call NSF International at 1-877-8-NSF-HELP."

(9) Special Notice for Nitrate Exceedance above MCL by Non-community Water Systems, Where Granted Permission by the Department.

(a) The owner or operator of a non-community water system granted permission by the Department under 310 CMR 22.13, and 310 CMR 22.13A to exceed the nitrate MCL shall provide notice to persons served according to the requirements for a Tier 1 notice under 310 CMR 22.16(2)(b) and (c).

(b) Form and Manner of the Special Notice: The owner/operator of a non-community water systems granted permission by the Department to exceed the nitrate MCL under 310 CMR 22.06 shall provide continuous posting of the fact that nitrate levels exceed ten mg/l and the potential health effects of exposure, according to the requirements for Tier 1 notice delivery under 310 CMR 22.16(2)(c) and the content requirements under 310 CMR 22.16(5).

(10) Notice by Department in Behalf of the Supplier of Water.

(a) The Department may give the notice required by 310 CMR 22.16 on behalf of the owner and operator of the public water system if the Department complies with the requirements of 310 CMR 22.16.

(b) The owner or operator of the public water system remains legally responsible for ensuring that the requirements of 310 CMR 22.16 are met.

(11) Public Notification by the Department for any Public Water System Subject to 310 CMR 22.00.

(a) The Department may require a supplier of water or any person subject to 310 CMR 22.00 to provide public notice for any violation of 310 CMR 22.00, the content of which shall either satisfy the requirements of 310 CMR 22.16(5), and/or be approved by the Department, prior to publication. The supplier of water remains legally responsible for ensuring that the requirements of 310 CMR 22.16 are met.

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(b) The Department reserves the right to give notice to the public when not required by 310 CMR 22.16 in the event of a significant health problem. The supplier of water shall be responsible for all fees incurred by the Department as a result such notice.

310 CMR 22.16 - Table 6
Violations and Other Situations Requiring Public Notice [1]

Contaminant	MCL/MRDL/TT violations [2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
I. **Violations of National Primary Drinking Water Regulations[3] and 310 CMR 22.00**				
A. **Microbiological Contaminants**				
1. Total coliform	2	310 CMR 22.05	3	310 CMR 22.05
2. Fecal coliform/E. coli	1	310 CMR 22.05	[4] 1, 3	310 CMR 22.05
3. Turbidity MCL	2	310 CMR 22.08 310 CMR 22.20A 310 CMR 22.20D	3	310 CMR 22.08 310 CMR 22.20A 310 CMR 22.20D
4. Turbidity MCL (average of 2 days' samples 5 NTU)	[5] 2, 1	310 CMR 22.08 310 CMR 22.20A	3	310 CMR 22.08 310 CMR 22.20A
5. Turbidity (for TT violations resulting from a single exceedance of maximum allowable turbidity level)	[6] 2, 1	310 CMR 22.08 310 CMR 22.20A 310 CMR 22.20D 310 CMR 22.20F	3	310 CMR 22.08 310 CMR 22.20A 310CMR 22.20D 310 CMR 22.20F
6. Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. allowable turbidity level (TT).	2	310 CMR 22.20A	3	310 CMR 22.20A
7. Interim Enhanced Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. turbidity level (TT).	2	[7]310 CMR 22.20D	3	310 CMR 22.20D
8. Filter Backwash Recycling Rule	2	310 CMR 22.20E	3	310 CMR 22.20E
9. Long Term 1 Enhanced Surface Water Treatment Rule	2	310 CMR 22.20F	3	310 CMR 22.20F
B. **Inorganic Chemicals (IOCs)**				
1. Antimony	2	310 CMR 22.06	3	310 CMR 22.06
2. Arsenic	2	310 CMR 22.06	3	310 CMR 22.06
3. Asbestos (fibers > 10 mm)	2	310 CMR 22.06	3	310 CMR 22.06
4.Barium	2	310 CMR 22.06	3	310 CMR 22.06
5. Beryllium	2	310 CMR 22.06	3	310 CMR 22.06
6. Cadmium	2	310 CMR 22.06	3	310 CMR 22.06
7. Chromium (total)	2	310 CMR 22.06	3	310 CMR 22.06
8. Cyanide	2	310 CMR 22.06	3	310 CMR 22.06
9. Fluoride	2	310 CMR 22.06	3	310 CMR 22.06
10. Mercury (inorganic)	2	310 CMR 22.06	3	310 CMR 22.06
11. Nitrate	1	310 CMR 22.06	[10] 1, 3	310 CMR 22.06
12. Nitrite	1	310 CMR 22.06	[10] 1, 3	310 CMR 22.06
13. Total Nitrate and Nitrite	1	310 CMR 22.06	3	310 CMR 22.06
14. Selenium	2	310 CMR 22.06	3	310 CMR 22.06

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Contaminant	MCL/MRDL/TT violations [2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
15. Thallium	2	310 CMR 22.06	3	310 CMR 22.06
C. **Lead and Copper Rule (Action Level for lead is 0.015 mg/L, for copper is 1.3 mg/L)**				
1. Lead and Copper Rule (TT	2	310 CMR 22.06B	3	310 CMR 22.06B
D. **Synthetic Organic Chemicals (SOCs)**				
1. 2,4-D	2	310 CMR 22.07A	3	310 CMR22.07A
2. 2,4,5-TP (Silvex)	2	310 CMR 22.07A	3	310 CMR22.07A
3. Alachlor	2	310 CMR 22.07A	3	310 CMR22.07A
4. Atrazine	2	310 CMR 22.07A	3	310 CMR22.07A
5. Benzo(a)pyrene (PAHs)	2	310 CMR 22.07A	3	310 CMR22.07A
6. Carbofuran	2	310 CMR 22.07A	3	310 CMR22.07A
7. Chlordane	2	310 CMR 22.07A	3	310 CMR22.07A
8. Dalapon	2	310 CMR 22.07A	3	310 CMR22.07A
9. Di (2-ethylhexyl) adipate	2	310 CMR 22.07A	3	310 CMR 22.07A
10. Di (2-ethylhexyl) phthalate	2	310 CMR 22.07A	3	310 CMR 22.07A
11. Dibromochloropropane	2	310 CMR 22.07A	3	310 CMR 22.07A
12. Dinoseb	2	310 CMR 22.07A	3	310 CMR 22.07A
13. Dioxin (2,3,7,8-TCDD)	2	310 CMR 22.07A	3	310 CMR 22.07A
14. Diquat	2	310 CMR 22.07A	3	310 CMR 22.07A
15. Endothall	2	310 CMR 22.07A	3	310 CMR 22.07A
16. Endrin	2	310 CMR 22.07A	3	310 CMR 22.07A
17. Ethylene dibromide	2	310 CMR 22.07A	3	310 CMR 22.07A
18. Glyphosate	2	310 CMR 22.07A	3	310 CMR 22.07A
19. Heptachlor	2	310 CMR 22.07A	3	310 CMR 22.07A
20. Heptachlor epoxide	2	310 CMR 22.07A	3	310 CMR 22.07A
21. Hexachlorobenzene	2	310 CMR 22.07A	3	310 CMR 22.07A
22. Hexachlorocyclo-pentadiene	2	310 CMR 22.07A	3	310 CMR22.07A
23. Lindane	2	310 CMR 22.07A	3	310 CMR 22.07A
24. Methoxychlor	2	310 CMR 22.07A	3	310 CMR 22.07A
25. Oxamyl (Vydate)	2	310 CMR 22.07A	3	310 CMR 22.07A
26. Pentachlorophenol	2	310 CMR 22.07A	3	310 CMR 22.07A
27. Picloram	2	310 CMR 22.07A	3	310 CMR 22.07A
28. Polychlorinated biphenyls (PCBs)	2	310 CMR 22.07A	3	310 CMR 22.07A
29. Simazine	2	310 CMR 22.07A	3	310 CMR 22.07A
30. Toxaphene	2	310 CMR 22.07A	3	310 CMR 22.07A
E. **Volatile Organic Chemicals (VOCs)**				
1. Benzene	2	310 CMR 22.07B	3	310 CMR 22.07B
2. Carbon tetrachloride	2	310 CMR 22.07B	3	310 CMR 22.07B
3. Chlorobenzene (monochlorobenzene)	2	310 CMR 22.07B	3	310 CMR 22.07B
4. o-Dichlorobenzene	2	310 CMR 22.07B	3	310 CMR 22.07B
5. p-Dichlorobenzene	2	310 CMR 22.07B	3	310 CMR 22.07B
6. 1,2-Dichloroethane	2	310 CMR 22.07B	3	310 CMR 22.07B
7. 1,1-Dichloroethylene	2	310 CMR 22.07B	3	310 CMR 22.07B
8. cis-1,2-Dichloroethylene	2	310 CMR 22.07B	3	310 CMR 22.07B
9. trans-1,2-Dichloroethylene	2	310 CMR 22.07B	3	310 CMR 22.07B
10. Dichloromethane	2	310 CMR 22.07B	3	310 CMR 22.07B
11. 1,2-Dichloropropane	2	310 CMR 22.07B	3	310 CMR 22.07B
12. Ethylbenzene	2	310 CMR 22.07B	3	310 CMR 22.07B
13. Styrene	2	310 CMR 22.07B	3	310 CMR 22.07B
14. Tetrachloroethylene	2	310 CMR 22.07B	3	310 CMR 22.07B

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Contaminant	MCL/MRDL/TT violations [2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
15. Toluene	2	310 CMR 22.07B	3	310 CMR 22.07B
16. 1,2,4-Trichlorobenzene	2	310 CMR 22.07B	3	310 CMR 22.07B
17. 1,1,1-Trichloroethane	2	310 CMR 22.07B	3	310 CMR 22.07B
18. 1,1,2-Trichloroethane	2	310 CMR 22.07B	3	310 CMR 22.07B
19. Trichloroethylene	2	310 CMR 22.07B	3	310 CMR 22.07B
20. Vinyl chloride	2	310 CMR 22.07B	3	310 CMR 22.07B
21. Xylenes (total)	2	310 CMR 22.07B	3	310 CMR 22.07B
F. **Radioactive Contaminants**				
1. Beta/photon emitters	22	310 CMR 22.09 310 CMR 22.09A	33	310 CMR 22.09 310 CMR 22.09A
2. Alpha emitters	22	310 CMR 22.09 310 CMR 22.09A	33	310 CMR 22.09 310 CMR 22.09A
3. Combined radium (226 & 228)	22	310 CMR 22.09 310 CMR 22.09A	33	310 CMR 22.09 310 CMR 22.09A
4. Uranium	22	310 CMR 22.09 310 CMR 22.09A	33	310 CMR 22.09 310 CMR 22.09A
G. **Disinfection Byproducts (DBPs),Byproduct Precursors, Disinfectant Residuals. Where disinfection used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acid (HAAs)**.[13]				
1. Total trihalomethanes (TTHMs)	2	310 CMR 22.07[14] 310 CMR 22.07E	3	310 CMR 22.07 310 CMR 22.07E
2. Haloacetic Acids (HAA5)	2	310 CMR 22.07E	3	310 CMR 22.07E
3. Bromate	2	310 CMR 22.07E	3	310 CMR 22.07E
4. Chlorite	2	310 CMR 22.07E	3	310 CMR 22.07E
5. Chlorine (MRDL)	2	310 CMR 22.07E	3	310 CMR 22.07E
6. Chloramine (MRDL)	2	310 CMR 22.07E	3	310 CMR 22.07E
7. Chlorine dioxide (MRDL) where any two consecutive daily samples at entrance to distribution system only are above MRDL	2	310 CMR 22.07E	2 [15], 3	310 CMR 22.07E
8. Chlorine dioxide (MRDL), where sample(s) in distribution system the next day are also above MRDL	[16] 1	310 CMR 22.07E	1	310 CMR 22.07E
9. Control of DBP precursors TOC (TT)	2	310 CMR 22.07E	3	310 CMR 22.07E
10. Bench marking and disinfection profiling	N/A	N/A	3	310 CMR 22.07F
11. Development of monitoring plan	N/A	N/A	3	310 CMR 22.07E

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Contaminant	MCL/MRDL/TT violations [2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
H. **Other Treatment Techniques**				
1. Acrylamide (TT)	2	310 CMR 22.04(10)	N/A	310 CMR 22.04(10)
2. Epichlorohydrin (TT)	2	310 CMR 22.04(10)	N/A	310 CMR 22.04(10)
II. **Unregulated Contaminant Monitoring**: [17]				
A. Unregulated contaminants	N/A	N/A	3	310 CMR 22.07C
B. Nickel	N/A	N/A	3	310 CMR 22.06
III. **Public Notification for Variances and Exemptions**:				
A. Operation under a variance or exemption	3	[18]310 CMR 22.13 310 CMR 22.14	N/A	N/A
B. Violation of conditions of a variance or exemption	2	[19]310 CMR 22.13 310 CMR 22.14	N/A	N/A
IV. **Other Situations Requiring Public Notification**:				
A. Fluoride secondary maximum contaminant level (SMCL) exceedance	3	310 CMR 22.06C	N/A	N/A
B. Exceedance of nitrate MCL for non-community systems, as allowed by the Department.	1	310 CMR 22.13 310 CMR 22.13A	N/A	N/A
C. Availability of unregulated contaminant monitoring data	3	310 CMR 22.07C	N/A	N/A
D. Waterborne disease outbreak	1	N/A	N/A	N/A
E. Other waterborne emergency [20].	1	N/A	N/A	N/A
F. Other situations as determined by the Department	[21] 1, 2, 3	N/A	N/A	N/A
G. Sodium	N/A	N/A	3	310 CMR 22.06A

Table 6 - Endnotes

1. Violations and other situations not listed in this table (*e.g.* ,reporting violations and failure to prepare Consumer Confidence Reports), do not require notice, unless otherwise determined by the Department. The Department may, at its option, also require a more stringent public notice tier (*e.g.*, Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3) for specific violations and situations listed in this Table, as authorized under 310 CMR 22.16(2)(a) and 310 CMR 22.16(3)(a).

2. MCL-Maximum contaminant level, MRDL-Maximum residual disinfectant level, TT-Treatment technique.

3. The term Violations of 310 CMR 22.00 is used here to include violations of MCL, MRDL ,treatment technique, monitoring, and testing procedure requirements.

4. Failure to test for fecal coliform or E. coli is a Tier 1violation if testing is not done after any repeat sample tests positive for coliform. All other total coliform monitoring and testing procedure violations are Tier 3.

5. Systems that violate the turbidity MCL of 5 NTU based on an average of measurements over two consecutive days shall consult with the Department within 24 hours after learning of the violation. Based on this consultation, the Department may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the Department in the 24-hour period, the violation is automatically elevated to Tier 1.

6. Systems with treatment technique violations involving a single exceedance of a maximum turbidity limit under 310 CMR 22.20A, the Surface Water Treatment Rule (SWTR), 310 CMR 22.20D, the Interim Enhanced Surface Water Treatment Rule (IESWTR), or 310 CMR 22.20F, the Long Term 1 Enhanced Surface Water Treatment Rule, are required to consult with the Department within 24 hours after learning of the violation. Based on this consultation, the Department may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the Department in the 24-hour period, the violation is automatically elevated to Tier 1.

7. Most of the requirements of the Interim Enhanced Surface Water Treatment Rule 310 CMR 22.20D become effective January 1, 2002 for surface water sources systems (surface water systems and ground water systems under the direct influence of surface water) serving at least 10,000 persons. However, 310 CMR 22.20D has some

22.16: continued

requirements that become effective as early as April 16, 1999. The Surface Water Treatment Rule, 310 CMR 22.20A, remains in effect for some systems serving at least 10,000 persons even after 2002; the Interim Enhanced Surface Water Treatment Rule, 310 CMR 22.20D, adds additional requirements and does not in many cases supercede the SWTR.

8. The arsenic MCL citations are effective January 23, 2006. Until then, the citations are 310 CMR 22.06.

9. The arsenic Tier 3 violation MCL citations are effective January 23, 2006. Until then, the citations are 310 CMR 22.06.

10. Failure to take a confirmation sample within 24 hours for nitrate or nitrite after an initial sample exceeds the MCL is a Tier 1 violation. Other monitoring violations for nitrate are Tier 3.

11. The uranium MCL Tier 2 violation citations are effective December 8, 2003 for all community water systems.

12. The uranium MCL Tier 3 violation citations are effective December 8, 2000 for all community water systems.

13. Surface water sources systems (surface water systems and ground water systems under the direct influence of surface water) serving at least 10,000 persons (community and non-transient non-community systems) shall comply with the new DBP MCLs, disinfectant MRDLs, and related monitoring requirements beginning January 1, 2002. All other community and non-transient non-community systems shall meet the MCLs and MRDLs beginning January 1, 2004. Surface water sources systems (surface water systems and ground water systems under the direct influence of surface water) serving at least 10,000 persons transient non-community systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant shall comply with the chlorine dioxide MRDL beginning January 1, 2002. Surface water sources systems (surface water systems and ground water systems under the direct influence of surface water) serving at least 10,000 persons transient non-community systems serving fewer than 10,000 persons and using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant shall comply with the chlorine dioxide MRDL beginning January 1, 2004.

14. 310 CMR 22.07 will no longer apply after January 1, 2004.

15. Failure to monitor for chlorine dioxide at the entrance to the distribution system the day after exceeding the MRDL at the entrance to the distribution system is a Tier 2 violation.

16. If any daily sample taken at the entrance to the distribution system exceeds the MRDL for chlorine dioxide and one or more samples taken in the distribution system the next day exceed the MRDL, Tier 1 notification is required. Failure to take the required samples in the distribution system after the MRDL is exceeded at the entry point also triggers Tier 1 notification.

17. Some water systems shall monitor for certain unregulated contaminants listed in 310 CMR 22.07C.

18. This citation refers to 310 CMR 22.13 and 310 CMR 22.14 and requires that "a schedule prescribed .. for a public water system granted a variance [or exemption] shall require compliance by the system . ."

19. In addition, 310 CMR 22.13A specifies the items and schedule milestones that shall be included in a variance for small systems.

20. Other waterborne emergencies require a Tier 1 public notice under 310 CMR 22.16 (2)(a)7. for situations that do not meet the definition of a waterborne disease outbreak given in 310CMR 22.02(1) but that still have the potential to have serious adverse effects on health as a result of short-term exposure. These could include outbreaks not related to treatment deficiencies, as well as situations that have the potential to cause outbreaks, such as failures or significant interruption in water treatment processes, natural disasters that disrupt the water supply or distribution system, chemical spills, or unexpected loading of possible pathogens into the source water.

21. The Department may place other situations in any tier they believe appropriate, based on threat to public health.

310 CMR 22.16 - Table 7

Standard Health Effects Language for Public Notification

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
A. Microbiological Contaminants:			
1a. Total coliform	Zero	See footnote[3]	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.
1b. Fecal coliform/E. coli	Zero	Zero	Fecal coliforms and E. coli are bacteria whose

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
			presence indicates that the water may be contam-inated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
2a. Turbidity (MCL)[4]	None	1 NTU[5] 5 NTU	Turbidity has no health effects. However, turbid-ity can interfere with disinfection and provide a medium for microbial growth. Turbidity may in-dicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nau-sea, cramps, diarrhea and associated headaches.
2b. Turbidity (SWTR TT)[6]	None	TT[7]	Turbidity has no health effects. However, turbid-ity can interfere with disinfection and provide a medium for microbial growth. Turbidity may in-dicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nau-sea, cramps, diarrhea and associated headaches.
2c. Turbidity (IESWTR TT) and LT1ESWTR TT)[8]	None	TT	Turbidity has no health effects. However, turbid-ity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organ-isms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated head-aches.
Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR) Filter Backwash Recycling Rule (FBRR), and Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) violations:			
3. Giardia lamblia (SWTR/IESWTR/LT1ESWTR).	Zero	TT[10]	Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.
4. Viruses (SWTR/IESWTR/ LT1ESWTR).			
5. Heterotrophic plate count (HPC) bacteria[9] (SWTR/IESWTR/LT1ESWTR).			
6. Legionella (SWTR/IESWTR/LT1ESWTR).			
7. Cryptosporidium (IESWTR/LT1ESWTR/FBRR).			
B. Inorganics			
8. Antimony	0.006	0.006	Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.
9. Arsenic[11]	None	0.05	Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
			risk of getting cancer.
10. Asbestos (10µm)	7MFL[12]	7MFL	asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.
11. Barium	2	2	Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
12. Beryllium	0.004	0.004	Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions
13. Cadmium	0.005	0.005	Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.
14. Chromium (total).	0.1	0.1	Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.
15. Cyanide	0.2	0.2	Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.
16. Fluoride	4	4	Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Fluoride in drinking water at half the MCL or more may cause mot-tling of children's teeth, usually in children less than nine years old. Mottling, also known as den-tal fluorosis, may include brown staining and/or pitting of the teeth, and occurs only in develop-ing teeth before they erupt from the gums.
17. Mercury (inorganic)	0.002	0.002	Some people who drink water containing inor-ganic mercury well in excess of the MCL over many years could experience kidney damage
18. Nitrate	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
19. Nitrite	1	1	Infants younger than of six months old who drink water containing nitrite in excess of the MCL could become seriously ill and, if un-treated, may die. Symptoms include shortness of breath and blue baby syndrome.
20. Total Nitrate and Nitrite	10	10	Infants younger than of six months old who drink water containing nitrate and nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
21. Selenium	0.05	0.05	Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could exper-ience hair or fingernail losses, numbness in fin-gers or toes, or problems with their circulation.
22. Thallium	0	0.002	Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
			problems with their kidneys, intestines, or liver.

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
C. Lead and Copper Rule:			
23. Lead	Zero	TT[13]	Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.
24. Copper	1.3	TT[14]	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.
D. Synthetic Organic Chemicals (SOCs):			
25. 2,4-D	0.07	0.07	Some people who drink water containing the weed killer 2,4-D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands
26. 2,4,5-TP (Silvex)	0.05	0.05	Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.
27. Alachlor	Zero	0.002	Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.
28. Atrazine	0.003	0.003	Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties
29. Benzo(a)pyrene (PAHs).	Zero	0	Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
30. Carbofuran	0.04	0.003	Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.
31. Chlordane	Zero	0.002	Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.
32. Dalapon	0.2	0.2	Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.
33. Di (2-ethylhexyl)	0.4	0.4	Some people who drink water containing diadipate. (2-ethylhexyl) adipate well in excess of the MCL over many years could experience

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
			general toxic effects or reproductive difficulties
34. Di (2-ethylhexyl) phthalate	Zero	0.006	Some people who drink water containing di (2-ethylhexyl) phthalate in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer.
35. Dibromochloropropane(DBCP).	Zero	0	Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
36. Dinoseb	0.007	0.007	Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.
37. Dioxin (2,3,7,8-TCDD).	Zero	$3x10^{-8}$	Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
38. Diquat	0.02	0.02	Some people who drink water containing diquat in excess of the MCL over many years could get cataracts
39. Endothall	0.1	0.1	Some people who drink water containing endo-thall in excess of the MCL over many years could experience problems with their stomach or intestines
40. Endrin	0.002	0.002	Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.
41. Ethylene dibromide	Zero	0	Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.
42. Glyphosate	0.7	0.7	Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.
43. Heptachlor	Zero	0	Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.
44. Heptachlor epoxide	Zero	0	Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.
45. Hexachlorobenzene	Zero	0.001	Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.
46. Hexachlorocyclopentadiene.	0.05	0.05	Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
			problems with their kidneys or stomach

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
47. Lindane	0	0	Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.
48. Methoxychlor	0.04	0.04	Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.
49. Oxamyl (Vydate)	0.2	0.2	Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.
50. Pentachlorophenol	Zero	0.001	Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer.
51. Picloram	0.5	0.5	Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.
52. Polychlorinated biphenyls (PCBs).	Zero	0.001	Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of cancer.
53. Simazine	0.004	0.004	Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.
54. Toxaphene	Zero	0.003	Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.
E. Volatile Organic Chemicals (VOCs):			
55. Benzene	Zero	0.005	Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of cancer.
56. Carbon tetrachloride	Zero	0.005	Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
57. Chlorobenzene (monochloro- benzene).	0.1	0.1	Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.
58. o-Dichlorobenzene	0.6	0.6	Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems
59. p-Dichlorobenzene	0.005	0.005	Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
			blood.
60. 1,2-Dichloroethane	Zero	0.005	Some people who drink water containing1,2-di-chloroethane in excess of the MCL over many years may have an increased risk of getting cancer.
61. 1,1-Dichloroethylene	0.007	0.007	Some people who drink water containing 1,1-di-chloroethylene in excess of the MCL over many years could experience problems with their liver.
62. cis-1,2- Dichloroethylene.	0.07	0.07	Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
63. trans-1,2- Dichloroethylene.	0.1	0.1	Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.
64. Dichloromethane	Zero	0.005	Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.
65. 1,2-Dichloropropane	Zero	0.005	Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.
66. Ethylbenzene	0.7	0.7	Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.
67. Styrene	0.1	0.1	Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.
68. Tetrachloroethylene	Zero	0.005	Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.
69. Toluene	1	1	Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.
70. 1,2,4-Trichlorobenzene	0.07	0.07	Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.
71. 1,1,1-Trichloroethane	0.2	0.2	Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.
72. 1,1,2-Trichloroethane	0.003	0.005	Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.
73. Trichloroethylene	Zero	0.005	Some people who drink water containing tri-

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
			chloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
74. Vinyl chloride	Zero	0.002	Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.
75. Xylenes (total)	10	10	Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.
F. Radioactive Contaminants:			
76. Beta/photon emitters	Zero	4 mrem/yr[15]	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
77. Alpha emitters	Zero	15 pCi/l [16]	Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess the MCL over many years may have an increased risk of getting cancer.
78. Combined radium (226 & 228).	Zero	5 pCi/l	Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
79. Uranium	Zero	30 mg/L	Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.
G. Disinfection Byproducts (DBPs),Byproduct Precursors, Disinfectant Residuals. Where disinfection used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acid (HAAs).[17]			
80. Total trihalomethanes (TTHMs)	N/A	0.10 0.080[18 19]	Some people who drink water containing (TTHMs) trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.
81. Haloacetic Acids (HAA)	N/A	0.0602	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.
82. Bromate	Zero	0.01	Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.
83. Chlorite	0.08	1	Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia.
84. Chlorine	4	4.0	Some people who use water containing chlorine

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
	(MRDLG)[21]	(MRDL)[22]	well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.
85. Chloramines	4 (MRDLG)	4.0 (MRDL)	Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.
86a. Chlorine dioxide, where any 2 consecutive daily samples taken at the entrance to the distribution system are above the MRDL.			Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. *Add for public notification only:* The chlorine dioxide violations reported today are the result of exceedances at the treatment facility only, not within the distribution system which delivers water to consumers. Continued compliance with chlorine dioxide levels within the distribution system minimizes the potential risk of these violations to consumers.
86b. Chlorine dioxide, where one or more distribution system samples are above the MRDL.	0.8 (MRCLG)	0.8 (MRDL)	Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. *Add for public notification only:* The chlorine dioxide violations reported today include exceedances of the EPA standard within the distribution system which delivers water to consumers. Violations of the chlorine dioxide standard within the distribution system may harm human health based on short-term exposures. Certain groups, including fetuses, infants, and young children, may be especially susceptible to nervous system effects from excessive chlorine dioxide exposure.
87. Control of DBP precursors (TOC)	None	TT	Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer.

22.16: continued

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
H. Other Treatment Techniques:			
88. Acrylamide	Zero	TT	Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.
89. Epichlorohydrin	Zero	TT	Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.

Table 7-Endnotes

1. MCLG-Maximum contaminant level goal
2. MCL-Maximum contaminant level
3. For water systems analyzing at least 40 samples per month, no more than 5.0% of the monthly samples may be positive for total coliforms. For systems analyzing fewer than 40 samples per month, no more than one sample per month may be positive for total coliforms.
4. There are various regulations that set turbidity standards for different types of systems, including 310 CMR 22.08, 310 CMR 22.20A, 310 CMR 22.20D, and 310 CMR 22.20F. The MCL for the monthly turbidity average is 1 NTU; the MCL for the 2-day average is 1 NTU for systems that are required to filter but have not yet installed filtration (310 CMR 22.08).
5. NTU-Nephelometric turbidity unit
6. There are various regulations that set turbidity standards for different types of systems, including 310 CMR 22.08, 310 CMR 22.20A, 310 CMR 22.20D, and 310 CMR 22.20F. Systems subject to the Surface Water Treatment Rule (both filtered and unfiltered) may not exceed 1 NTU. In addition, in filtered systems, 95% of samples each month shall not exceed 0.5 NTU in systems using conventional or direct filtration and shall not exceed 1 NTU in systems using slow sand or diatomaceous earth filtration or other filtration technologies approved by the Department.
7. TT-Treatment technique
8. There are various regulations that set turbidity standards for different types of systems, including 310 CMR 22.08, 310 CMR 22.20A, 310 CMR 22.20D, and 310 CMR 22.20F. For systems subject to 310 CMR 22.20D (systems serving at least 10,000 people, using surface water or ground water under the direct influence of surface water), that use conventional filtration or direct filtration, after January 1, 2002, the turbidity level of a system's combined filter effluent may not exceed 0.3 NTU in at least 95% of monthly measurements, and the turbidity level of a system's combined filter effluent shall not exceed 1 NTU at any time. Systems subject to 310 CMR 22.20D using technologies other than conventional, direct, slow sand, or diatomaceous earth filtration shall meet turbidity limits set by the Department. For systems subject 310 CMR 22.20F (systems serving fewer than 10,000 people, using surface water or ground water under the influence of surface water) that use conventional or direct filtration, after January 1, 2005 the turbidity level of a system's combined filter effluent may not exceed 0.3 NTU in at least 95% of monthly measurements, ant the turbidity level of a system's combined filter effluent must not exceed 1 NTU at any time. Systems subject to 310 CMR 22.20F using technologies other than conventional, direct, slow sand, or diatomaceous earth filtration must meet turbidity limits set by the Department.

NON-TEXT PAGE

22.16: continued

9. The bacteria detected by heterotrophic plate count (HPC) are not necessarily harmful. HPC is simply an alternative method of determining disinfectant residual levels. The number of such bacteria is an indicator of whether there is enough disinfectant in the distribution system.

10. 310 CMR 22.20A, 310 CMR 22.20D, and 310 CMR 22.20F treatment technique violations that involve turbidity exceedances may use the health effects language for turbidity instead.

11. These arsenic values effective January 23, 2006. Until then, the MCL is 0.05 mg/L and there is no MCLG.

12. Millions fibers per liter.

13. Action Level = 0.015 mg/L

14. Action Level = 1.3 mg/L

15. Millirems per years

16. The uranium MCL is effective December 8, 2003 for all community water systems

17. Picocuries per liter

18. Surface water systems and ground water systems under the direct influence of surface water are regulated under 310 CMR 22.20A. Surface water sources systems (surface water systems and ground water systems under the direct influence of surface water) serving at least 10,000 persons community and non-transient non-community systems shall comply with DBP MCLs and disinfectant maximum residual disinfectant levels (MRDLs) beginning January 1, 2002. All other community and non-transient non community systems shall meet the MCLs and MRDLs beginning January 1, 2004. Surface water sources systems (surface water systems and ground water systems under the direct influence of surface water) serving at least 10,000 or more persons transient non-community systems using chlorine dioxide as a disinfectant or oxidant shall comply with the chlorine dioxide MRDL beginning January 1, 2002. Surface water sources systems (surface water systems and ground water systems under the direct influence of surface water) serving fewer than 10,000 persons transient non-community systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant shall comply with the chlorine dioxide MRDL beginning January 1, 2004.

18. The MCL of 0.10 mg/l for TTHMs is in effect until January 1, 2002 for community surface water systems (surface water systems and ground water systems under the direct influence of surface water) serving 10,000 or more. This MCL is in effect until December 31, 2003 for community water systems with a population of less than 10,000 using only ground water not under the direct influence of surface water. After these deadlines, the MCL will be 0.080 mg/l. On January 1, 2004, all systems serving less than 10,000 will have to comply with the new MCL as well.

19. The MCL for total trihalomethanes is the sum of the concentrations of the individual trihalomethanes.

20. The MCL for haloacetic acids is the sum of the concentrations of the individual haloacetic acids.

21. MRDLG-Maximum residual disinfectant level goal.

22. MRDL-Maximum residual disinfectant level.

22.16A: Consumer Confidence Reporting Requirements

(1) Each community water system in existence as of September18,1998, must deliver its first consumer confidence report to its customers by October 19, 1999, its second report by July 1, 2000, and subsequent reports by July 1 annually thereafter. The first report must contain data collected during, or prior to, calendar year 1998, as provided in 22.16A(4)(h). Each report thereafter must contain data collected prior to or during the previous calendar year as specified at 310 CMR 22.16A(4)(h).

(2) Each community water system established after January 1, 1999, must deliver its first consumer confidence report to its customers by July 1 of the year after its first full calendar year in operation and annually thereafter.

(3) A public water system that sells or provides water to another community water system shall deliver the applicable information required at 310 CMR 22.16A(4), to the buyer or receiving system:

(a) no later than April 19, 1999, by April 1, 2000, and by April 1 annually thereafter, or

(b) on a date mutually agreed upon by the seller and the purchaser, and specifically included in a written contract between the parties.

(4) Content of the Reports. Each community water system must provide to its customers an annual report that contains the information specified in 310 CMR 22.16A(4).

(a) Each report must identify the source(s) of the water delivered by the community water system by providing information on:

1. The type of the water: e.g., surface water, ground water; and
2. The commonly used name and the Department's source water identification number (if any) and location of the body (or bodies) of water.

(b) If a source water assessment has been completed, the report must notify consumers of the availability of this information and the means to obtain it. In addition, the public water systems are encouraged to highlight in the report significant sources of contamination in the source water area if they have readily available information. Where a system has received a source water assessment form the Department, the report shall include a brief summary of the public water system's susceptibility to potential sources of contamination, using language provided by the Department.

(c) Each report must include the following definitions:

1. Maximum Contaminant Level Goal or MCLG. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
2. Maximum Contaminant Level or MCL. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology

(d) A report for a community water system operating under a variance or an exemption issued by the Department must include the following definition:

Variances and Exemptions. The Department or EPA permission not to meet an MCL or a treatment technique under certain conditions.

(e) A report that contains data on a contaminant for which the Department or EPA regulates using any of the following terms must include the applicable definitions:

1. Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.
2. Action Level. The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
3. Maximum residual disinfectant levels goal or MRDLG: The level of a drinking water disinfectant which there is no known or expected risk to health MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

22.16A: continued

4. Maximum residual disinfectant level or MRDL: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminant.

(f) Information on Detected Contaminants. 310 CMR 22.16A(4) specifies the requirements for information to be included in each report for contaminants subject to mandatory monitoring (except *Cryptosporidium*). It applies to:

1. Contaminants subject to an MCL, action level, maximum residual disinfectant or treatment technique (regulated contaminants);

2. Contaminants for which monitoring is required by 310 CMR 22.07C (unregulated contaminants); and

3. Disinfection by-products or microbial contaminants for which monitoring is required by 40 CFR 141.142 and 141.143, except as provided at 310 CMR 22.16A(5)(a), and which are detected in the finished water.

(g) The data relating to these contaminants must be displayed in one table or in several adjacent tables. Any additional monitoring results which a community water system chooses to include in its report must be displayed separately.

(h) The data must be derived from data collected to comply with EPA and Department monitoring and analytical requirements during calendar year 1998 for the first report and subsequent calendar years thereafter except that:

1. Where a system is allowed to monitor for regulated contaminants less often than once a year, the table(s) must include the date and results of the most recent sampling and the report must include a brief statement indicating that the data presented in the report are from the most recent testing done in accordance with the regulations. No data older than five years need be included.

2. Results of monitoring in compliance with 40 CFR 141.142 and 141.143 need only be included for five years from the date of last sample or until any of the detected contaminants becomes regulated and subject to routine monitoring requirements, whichever comes first.

(i) For detected regulated contaminants listed in 310 CMR 22.00 and in Appendix M of the Guidelines and Policies for Public Water Systems, the table(s) must contain:

1. The MCL for that contaminant expressed as a number equal to or greater than 1.0 as provided in Appendix M of the Guidelines and Policies for Public Water Systems;

2. The MCLG for that contaminant expressed in the same units as the MCL;

3. If there is no MCL for a detected contaminant, the table must indicate that there is a treatment technique maximum residual disinfection level, or specify the action level, applicable to that contaminant, and the report must include the definitions for treatment technique maximum residual disinfection level and/or action level, as appropriate, specified at 310 CMR 22.16A(4)(e);

4. For contaminants subject to an MCL, except turbidity and total coliforms, the highest contaminant level used to determine compliance with 310 CMR 22.00 and the range of detected levels, as follows:

a. When compliance with the MCL is determined annually or less frequently: the highest detected level at any sampling point and the range of detected levels expressed in the same units as the MCL.

b. When compliance with the MCL is determined by calculating a running annual average of all samples taken at a sampling point: the highest average of any of the sampling points and the range of all sampling points expressed in the same units as the MCL.

c. When compliance with the MCL is determined on a system-wide basis by calculating a running annual average of all samples at all sampling points: the average and range of detection expressed in the same units as the MCL.

d. When rounding of results to determine compliance with the MCL is allowed by the 310 CMR 22.00, rounding should be done prior to multiplying the results by the factor listed in Appendix M of the Guidelines and Policies for Public Water Systems,

5. For Turbidity.

a. When it is reported pursuant to 310 CMR 22.08: the highest average monthly value.

b. When it is reported pursuant to the requirements of 310 CMR 22.20A: the highest monthly value. The report shall include an explanation of the reasons for measuring turbidity.

22.16A: continued

c. When it is reported pursuant to 310 CMR 22.20A the highest single measurement and the lowest monthly percentage of samples meeting the turbidity limits specified in 310 CMR 22.20A for the filtration technology being used. The report shall include an explanation of the reasons for measuring turbidity.

6. For Lead and Copper. For each contaminant the 90th percentile value of the most recent round of sampling and the number of sampling sites exceeding the action level.

7. For Total Coliform.

a. The highest monthly number of positive samples for systems collecting fewer than 40 samples per month; or

b. The highest monthly percentage of positive samples for systems collecting at least 40 samples per month.

8. For fecal coliform or *E.coli*: the total number of positive samples; and.

9. The likely source(s) of detected contaminants to the best of the operator's knowledge. Specific information regarding contaminants may be available in sanitary surveys and source water assessments, and should be used when available to the operator. If the operator lacks specific information on the likely source, the report must include one or more of the typical sources for that contaminant listed in Appendix M of the Guidelines and Policies for Public Water Systems, that is most applicable to the system.

(j) If a community water system distributes water to its customers from multiple hydraulically independent distribution systems that are fed by different raw water sources, the table should contain a separate column for each service area and the report should identify each separate distribution system. Alternatively, systems could produce separate reports tailored to include data for each service area.

(k) The table(s) must clearly identify any data indicating violations of MCLs, MRDLs or treatment techniques and the report must contain a clear and readily understandable explanation of the violation including: the length of the violation, the potential adverse health effects, and actions taken by the system to address the violation. To describe the potential health effects, the system must use the relevant language in Appendix M of the Guidelines and Policies for Public Water Systems.

(l) For detected unregulated contaminants for which monitoring is required (except *Cryptosporidium*), the table(s) must contain the average and range at which the contaminant was detected. The report may include a brief explanation of the reasons for monitoring for unregulated contaminants.

(5) Information on Cryptosporidium, Radon, and other Contaminants.

(a) If the system performed any monitoring for *Cryptosporidium*, including monitoring performed to satisfy the requirements of 40 CFR 141.143, which indicates that *Cryptosporidium* may be present in the source water or the finished water, the report must include:

1. A summary of the results of the monitoring; and
2. An explanation of the significance of the results.

(b) If the system performed any monitoring for radon which indicates that radon may be present in the finished water, the report must include:

1. The results of the monitoring; and
2. An explanation of the significance of the results.

(c) If the system performed additional monitoring which indicates the presence of other contaminants in the finished water, the public water system shall report any results which may indicate a health concern. The Department considers detects above a proposed MCL or health advisory level to indicate possible health concerns. For such contaminants, the Department recommends that the report include:

1. The results of the monitoring; and
2. An explanation of the significance of the results noting the existence of a health advisory or a proposed regulation.

22.16A: continued

(6) In addition, to the requirements of 310 CMR 22.16A(4)(k), the report must note any violation that occurred during the year covered by the report of a requirement listed below, and include a clear and readily understandable explanation of the violation, any potential adverse health effects, and the steps the system has taken to correct the violation.

(a) Monitoring and reporting of compliance data;

(b) Filtration and disinfection: For systems which have failed to install adequate filtration or disinfection equipment or processes, or have had a failure of such equipment or processes which constitutes a violation, the report must include the following language as part of the explanation of potential adverse health effects: Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

(c) Lead and copper control: For systems which fail to take one or more actions prescribed by 310 CMR 22.06B(1)(d)(1), 310 CMR 22.06B(3), 310 CMR 22.06B(4) or 310 CMR 22.06B(5), the report must include the applicable language of Appendix M of the Guidelines and Policies for Public Water Systems for lead, copper, or both.

(d) Treatment techniques for Acrylamide and Epichlorohydrin: For systems which violate the requirements of 310 CMR 22.07B, the report must include the relevant language from Appendix M of the Guidelines and Policies for Public Water Systems.

(e) Recordkeeping of compliance data.

(f) Special monitoring requirements prescribed by 310 CMR 22.07C and 310 CMR 22.06A; and

(g) Violation of the terms of a variance, an exemption, or an administrative or judicial order.

(7) Variances and Exemptions. If a system is operating under the terms of a variance or an exemption issued under 310 CMR 22.13, 310 CMR 22.13A or 310 CMR 22.14, the report must contain:

(a) An explanation of the reasons for the variance or exemption;

(b) The date on which the variance or exemption was issued;

(c) A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption; and

(d) A notice of any opportunity for public input in the review, or renewal, of the variance or exemption.

(8) Additional Information.

(a) The report must contain a brief explanation regarding contaminants which may reasonably be expected to be found in drinking water including bottled water. This explanation may include the language of paragraph 310 CMR 22.16A(8)(a)1. through 3., or systems may use their own comparable language with Department approval. The report also must include the language of paragraph 310 CMR 22.16A(8)(a)4.

1. Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.
2. Contaminants that may be present in source water include:
   a. Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
   b. Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
   c. Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
   d. Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

22.16A: continued

e. Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

3. In order to ensure that tap water is safe to drink, the Department and EPA prescribe regulations which limit the amount of certain contaminants in water provided by public water systems. FDA and the Massachusetts Department of Public Health regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

4. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791) or your local water supplier.

(b) The report must include the PWSID#, address, telephone number of the owner, operator, or designee of the community water system as a source of additional information concerning the report.

(c) In communities with 10% or greater, or greater than 1000 people (whichever is lesser) of non-English speaking residents, the report must contain information in the appropriate language(s) regarding the importance of the report. In communities serving 25% or greater of non-English speaking residents, the report must contain a statement in the appropriate languages which includes a telephone number or address where such residents may contact the system to obtain a translated copy of the report or assistance in the appropriate language.

(d) The report must include information (e.g., time and place of regularly scheduled board meetings) about opportunities for public participation in decisions that may affect the quality of the water.

(e) The systems may include such additional information as they deem necessary for public education consistent with, and not detracting from, the purpose of the report.

(f) The public water system shall include any additional language as specified by the Department.

(9) Required Additional Health Information. All reports must prominently display the following language:

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

(10) A community water system which detects arsenic at levels above 0.025 mg/L, but below the MCL:

(a) Shall include in its report a short informational statement about arsenic, using language such as: EPA is reviewing the drinking water standard for arsenic because of special concerns that it may not be stringent enough. Arsenic is a naturally-occurring mineral known to cause cancer in humans at high concentrations.

(b) Ending in the report due by July 1, 2001, a system which detects arsenic at levels above 0.025 mg/L, but below the 0.05 mg/L, and beginning in the report due by July 1, 2002, a system that detects arsenic above 0.005 mg/L and up to and including 0.010 mg/L:

1. Shall include in its report a short informational statement about arsenic, using language such as: While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of arsenic which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

2. May write its own educational statement, but only in consultation with and approval of the Department.

22.16A: continued

(c) Beginning in the report due by July 1, 2002 and ending January 22, 2006, a community water system that detects arsenic above 0.01 mg/L and up to and including 0.05 mg/L shall include the arsenic health effects language prescribed by Appendix M of the Guidelines and Policies.

(11) A community water system which detects nitrate at levels above 5 mg/l, but below the MCL:
(a) Must include a short informational statement about the impacts of nitrate on children using language such as: Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.
(b) May write its own educational statement, but only in consultation with and approval of the Department.

(12) A community water system which detects lead above the action level in more than 5%, and up to and including 10%, of homes sampled:
a. Must include a short informational statement about the special impact of lead on children using language such as: Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested and flush your tap for 30 seconds to two minutes before using tap water. Additional information is available from the Safe Drinking Water Hotline (800-426-4791).
b. May write its own educational statement, but only in consultation with and approval of the Department.

(13) Community water systems that detect TTHM above 0.080 mg/l, but below the MCL listed in 310 CMR 22.07 as an annual average, monitored and calculated under the provisions of 310 CMR 22.07, must include health effects language prescribed in Appendix M of the Guidelines and Policies for Public Water Systems.

(14) Report Delivery and Recordkeeping. .Except as provided in 310 CMR 22.16A(20), each community water system must mail or otherwise directly deliver one copy of the Consumer Confidence Report to each customer.

(15) The community water system must make a good faith effort to reach consumers who do not get water bills, and are required to take a minimum of three of the following actions:
(a) Post report in the lobby of apartment complexes;
(b) Place an ad in a local newspaper stating where copies are available;
(c) Announce availability of the consumer confidence report on local radio stations;
(d) Post consumer confidence report in Town Hall;
(e) Place copies of the consumer confidence report in the local public library;
(f) Post a notice (in main lobby of apartment complexes) stating that the consumer confidence report is posted on a website, and give the website address;
(g) Publish the report in local newspaper(s);
(h) Deliver the report to community organizations;

(16) No later than the date the community water system is required to distribute the report to its customers, the system shall submit:
(a) three copies of the consumer confidence report and the related attachments to the Department, two of which will be submitted to the applicable Department regional office and one will be submitted to the Boston office; and
(b) a certification, using the Department's form in Appendix M of the Guidelines and Policies for Public Water Systems, that the report has been distributed to customers, and that the information is correct and consistent with the compliance monitoring data previously submitted to the Department.

22.16A: continued

(17) No later than the date the system is required to distribute the report to its customers, each community water system must deliver the report to its local Board of Health or any other agency identified by the Department.

(18) Each community water system must make its reports available to the public upon request.

(19) Each community water system serving 100,000 or more persons must post its most recent report to a publicly-accessible site on the Internet, including WEB site address.

(20) A community water system serving fewer than 10,000 persons has the option of mailing or directly delivering copies of the consumer confidence report to each customer, as provided in 310 CMR 22.16A(14)(a) and (b), or, alternatively, such system must comply with the following notice requirements:.

(a) Publish the report in one or more local newspapers serving the area in which the system is located;

(b) Inform the customers that the reports will not be mailed. Notification shall be either in the newspapers in which the reports are published or by a statement in a bill or newsletter; and

(c) Make the reports available to the public upon request.

(21) A community water systems serving 500 or fewer persons may forego the requirements of 310 CMR 22.16A(20), if the system provides a notice at least once per year to its customers by mail, door-to-door delivery or by posting in an appropriate location, that the report shall be available upon request.

(22) Any system subject to 310 CMR 22.16A, must retain copies of its Consumer Confidence Report for no less than three years.

(23) The Department will require non-community public water systems to comply with 310 CMR 22.16A to the extent provided in the Department's Drinking Water Guidelines and Policies, Appendix M.

(24) The Department, with EPA approval, may edit the requirements found in the Department's Drinking Water Guidelines and Policies Appendix M

(25) Consumer Confidence Report by the Department for Any Public Water System Subject to 310 CMR 22.16A. The Department may prepare and issue to the public a report as required by 310 CMR 22.16A on behalf of the public water system. The public water system remains legally responsible for ensuring that the requirements of 310 CMR 22.16A are met. The Department reserves the right to issue on behalf of the public water system the report to the public when not required by 310 CMR 22.16A in the event of a significant health problem. The public water system shall be responsible for all fees incurred by the Department as a result of issuing such report.

(26) A public water system receiving water from a source approved by the Department under an emergency agreement shall comply with 310 CMR 22.16A(4) for the emergency source unless otherwise approved in writing by the Department.

22.17: Record Maintenance

All suppliers of water shall retain on their premises or at a convenient location near their premises in a form admissible as evidence in Massachusetts Courts the following records:

(1) Records of bacteriological analyses made pursuant to 310 CMR 22.00 shall be kept for not less than five years. Records of analysis for other than microbiological contaminants (including total coliform, fecal coliform, and heterotrophic plate count), residual disinfectant concentration, other parameters necessary to determine disinfection effectiveness (including temperature and pH measurements), and turbidity shall be retained for not less than 12 years. Actual laboratory

22.17: continued

reports may be kept, or data may be transferred to tabular summaries, provided that such summaries are in a form admissible as evidence in Massachusetts Courts and shall include at least the following information in a form that demonstrates an unbroken chain of custody of the samples analyzed from sampling through analysis and includes at least the following:

(a) The date, place and time of sampling, the full name of the person who collected the sample and the agency or organization for which that person works;

(b) Identification of the sample as to whether it was a routine distribution system sample, check sample, raw or process water sample or other special purpose sample;

(c) Date of analysis;

(d) Laboratory and person responsible for performing analysis;

(e) The analytical technique/method and instruments used and

(f) The results of the analysis.

(2) Records of action taken by the system to correct violation of 310 CMR 22.00 shall be kept for a period not less than three years after the last action taken with respect to the particular violation involved.

(3) Copies of any written reports, summaries, or communications relating to sanitary surveys of the system conducted by the system itself, by a private consultant, or by any local, State or Federal agency, shall be kept for a period not less than ten years after completion of the sanitary survey involved.

(4) Records concerning a variance or exemption granted to the system shall be kept for a period ending not less than five years following the expiration of such variance or exemption.

(5) Records concerning the use of chemicals added to the water supply shall be kept for not less than five years. Said records shall include the information prescribed in 310 CMR 22.15(4).

(6) Records of the sizes and materials of construction of all water mains, records of materials used in joints of water mains, and records of the materials of construction of all services shall be maintained.

(7) Each supplier of water shall be responsible for maintaining current inventory information for the public water system in there charge and shall retain inventory records of public water systems for not less than 12 years. Said records shall include the information prescribed in 310 CMR 22.15(5).

(8) A record of the most recent vulnerability determination, including the monitoring results and other data supporting the determination, the Department's findings based on the supporting data and any additional bases for such determination; except that it shall be kept in perpetuity or until a more current vulnerability determination has been issued.

(9) A record of all current monitoring requirements and the most recent monitoring frequency decision pertaining to each contaminant, including the monitoring results and other data supporting the decision, the Department's findings based on the supporting data and any additional bases for such decision; except that the record shall be kept in perpetuity or until a more recent monitoring frequency decision has been issued.

(10) A record of the most recent asbestos repeat monitoring determination, including the monitoring results and other data supporting the determination, the Department's findings based on the supporting data and any additional bases for the determination and the repeat monitoring frequency; except that these records shall be maintained in perpetuity or until a more current repeat monitoring determination has been issued.

(11) Copies of the public notices issued pursuant to 310 CMR 22.16 and certifications made to the Department pursuant to 310 CMR 22.15(3)(b) shall be kept for three years after issuance.

22.17: continued

(12) Each supplier of water who is subject to the requirements of 310 CMR 22.20F shall, in addition to recordkeeping requirements under 310 CMR 22.20A(6), maintain records as follows:

(a) Individual Filter Turbidity Requirements. The results of individual filter monitoring, conducted in accordance with 310 CMR 22.20D(6)(b) and 310 CMR 22.20F(7)(a) through 310 CMR 22.20F(7)(e), must be kept for at least three years.

(b) Disinfection Profiling. The results of the profile (including raw data and analysis), conducted in accordance with 310 CMR 22.20D(3)(b) and 310 CMR 22.20F(4)(a) through 310 CMR 22.20F(4)(g), must be kept indefinitely.

(c) Disinfection Benchmarking. The benchmark (including raw data and analysis), conducted in accordance with 310 CMR 22.20D(3)(c) and 310 CMR 22.20F (5)(a) through 310 CMR 22.20F(5)(e), must be kept indefinitely.

22.18: Right of Entry

All suppliers of water shall authorize agents and employees of the Commonwealth, upon presentation of their credentials, to enter their premises, excluding dwelling places, without a warrant for the purpose of inspecting, surveying and sampling public water systems, whether or not the Commonwealth has evidence that the system is in violation of an applicable legal requirement.

22.19: Distribution System Requirements

In order to protect the distribution system of a public water system from contamination the following requirements shall be applied:

(1) All service connections shall have a minimum residual water pressure at street level of at least 20 pounds per square inch under all design conditions of flow.

(2) Water Storage Tanks: All water storage tanks used for the storage of ground or treated water which are connected to a distribution system of a public water system shall be covered and constructed and located so as to adequately protect the water from contamination. Tank vents and overflow pipes shall be properly screened to prevent contamination and not be directly connected to sanitary sewers or to storm drainage systems. Sewers, drains, standing water and similar sources of possible contamination must be kept at least 50 feet from the tank. Water main pipe, pressure tested to 50 pounds per square inch without leakage, may be used for gravity sewers at distances greater than 20 feet and less than 50 feet from said water storage tank.

(3) Storage Reservoirs: Open or uncovered earth embankment or reinforced concrete reservoirs, which are connected to a distribution system of a public water system, and used to store ground or treated water whose intended purpose is to equalize hourly and daily fluctuations of water, may continue to be used provided that said facility complies with the requirements of 310 CMR 22.20A.

22.20A: Surface Water Treatment Rule

(1) General Requirements.

(a) 310 CMR 22.20A establishes criteria under which filtration is required as a treatment technique for public water systems supplied by surface water sources and ground water sources under the direct influence of surface water. In addition, 310 CMR 22.20A establishes treatment technique requirements in lieu of maximum contaminant levels for the following contaminants:

1. *Giardia lamblia*,
2. Viruses,
3. Heterotrophic plate count bacteria,
4. *Legionella*, and
5. Turbidity.

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(b) Each supplier of water with a surface water source, or ground water source under the direct influence of surface water, must provide treatment of that source water that complies with the treatment technique requirements set forth in 310 CMR 22.20A. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

1. At least 99.9% (3-log) removal and/or inactivation of *Giardia lamblia* cysts between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer; and
2. At least 99.99% (4-log) removal and/or inactivation of viruses between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

(c) A supplier of water using a surface water source or ground water source under the direct influence of surface water shall be deemed in compliance with the requirements of 310 CMR 22.20A(1)(a) and (b) if:

1. It meets the requirements for avoiding filtration in 310 CMR 22.20A(2) and the disinfection requirements in 310 CMR 22.20A(3)(a); or

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2. It meets the filtration requirements in 310 CMR 22.20A(4) and the disinfection requirements in 310 CMR 22.20A(3)(b).

(d) Each supplier of water using a surface water source or a ground water source under the direct influence of surface water must be operated by a certified operator in compliance with 310 CMR 22.11B.

(e) In addition to complying with requirements of 310 CMR 22.20A, systems serving at least 10,000 people shall also comply with the requirements of 310 CMR 22.20D.

(f) In addition to complying with the requirements of 310 CMR 22.20A, each supplier of water that serves fewer than 10,000 people must also comply with the requirements in 310 CMR 22.20F.

(2) Criteria for Avoiding Filtration. A supplier of water that uses a surface water source must meet all of the conditions in 310 CMR 22.20A(2)(a) and 310 CMR 22.20A(2)(b) and is subject to 310 CMR 22.20A(2)(c) beginning June 29, 1991, unless the Department has notified it in writing that filtration is required. A supplier of water that uses a ground water source under the direct influence of surface water must meet all of the conditions in 310 CMR 22.20A(2)(a) and 310 CMR 22.20A(2)(b) and is subject to 310 CMR 22.20A(2)(c) beginning 18 months after the Department determines that it is under the direct influence of surface water, or June 29, 1991, whichever is later, unless the Department has notified it in writing that filtration is required. If the Department determines in writing, before June 29, 1991 that filtration is required, the supplier of water must have installed filtration and meet the criteria for filtered systems specified in 310 CMR 22.20A(3)(b) and 310 CMR 22.20A(4) by June 29, 1993. Within 18 months of the failure of a system using a surface water source or a ground water source under the direct influence of surface water to meet any one of the requirements in 310 CMR 22.20A(2)(a) and 310 22.20A(2)(b) or after June 29, 1993, whichever is later, the supplier of water must have installed filtration and meet the criteria for filtered systems specified in 310 CMR 22.20A(3)(b) and 310 CMR 22.20A(4).

(a) Source water quality conditions.

1. The fecal coliform concentration must be equal to or less than 20/100 ml, or the total coliform concentration must be equal to or less than 100/100 ml (measured as specified in 310 CMR 22.20A(5)(a)2. and 310 CMR 22.20A(5)(b)1. in representative samples of the source water immediately prior to the first or only point of disinfectant application in at least 90% of the measurements made for the six previous months that the system served water to the public on an ongoing basis. If a system measures both fecal and total coliform, the fecal coliform criterion, but not the total coliform criterion, in 310 CMR 22.20A(2)(a)1. must be met.

2. The turbidity level cannot exceed 1 NTU (measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(b)2. in representative samples of the source water immediately prior to the first or only point of disinfectant application except that five or fewer turbidity units may be allowed if the supplier of water can demonstrate to the Department that the higher turbidity does not do any of the following:

a. Interfere with disinfection.

b. Prevent maintenance of an effective disinfectant agent throughout the distribution system; or

c. Interfere with microbiological determinations.

3. The turbidity level cannot exceed 5 NTU (at any time) unless:

a. The Department determines that any such event was caused by circumstances that were unusual and unpredictable; and

b. As a result of any such event, there have not been more than two events in the past 12 months the system served water to the public, or more than five events in the past 120 months the system served water to the public, in which the turbidity level exceeded 5 NTU. An "event" is a series of consecutive days during which at least one turbidity measurement each day exceeds 5 NTU.

(b) Site-specific Conditions.

1. A supplier of water must meet the requirements of 310 CMR 22.20A(3)(a)1. at least 11 of the 12 previous months that its system served water to the public on an ongoing basis, unless the system fails to meet the requirements during two of the 12 previous months that the system served water to the public, and the Department determines that at least one of the failures was caused by circumstances that were unusual and unpredictable.

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2. A supplier of water must meet the requirements of 310 CMR 22.20A(3)(a)2. at all times its system serves water to the public unless otherwise approved by the Department.

3. A supplier of water must meet the requirements of 310 CMR 22.20A(3)(a)3. at all times its system serves water to the public unless the Department determines that any such failure was caused by circumstances that were unusual and unpredictable.

4. A supplier of water must meet the requirements of 310 CMR 22.20A(3)(a)4. on an ongoing basis, unless the Department determines that any such failure was not caused by a deficiency in treatment of the source water.

5. A supplier of water must maintain a Watershed Protection/Control Program that adequately minimizes the potential for contamination by *Giardia lamblia* cysts, *Cryptosporidium* oocysts and viruses. The Program must conform to the Drinking Water Program's Watershed Resource Protection Plan (WRPP) Policy set forth in the Drinking Water Program "Guidelines and Policies for Public Water Systems", a copy of which is available from the Drinking Water Program. During onsite inspection, the Department will determine whether the Watershed Protection/Control Program is adequate to minimize the potential for contamination by *Giardia lamblia* cysts, *Cryptosporidium oocysts* and viruses in the source water. The adequacy of the Watershed Protection/Control Program to prevent potential contamination of the source water and other contaminants must be based on:

a. The comprehensiveness of the watershed review;

b. The effectiveness of the system's program to monitor and control detrimental activities occurring in the watershed; and the

c. Extent to which the water system has maximized land ownership and/or controlled land use within the watershed.

d. At a minimum, a Watershed Protection/Control Program shall include the following information:

(i) a watershed description, including maps and accompanying narratives of major physical features, components of the water system, and hydrological characteristics;

(ii) the watershed characteristics and activities which may have an adverse effect on source water quality;

(iii) a risk assessment and plan for controlling detrimental activities/events that may have an adverse impact on source water quality;

(iv) a plan for monitoring raw water quality parameters at locations vulnerable to contamination from detrimental activities;

(v) demonstrated control through land ownership and/or land use restrictions on all human activities within the watershed which may have an adverse impact on the microbiological quality of the source water; and

(vi) a management plan for staffing, training and maintaining effective day-to-day operations (including emergency response to contamination) and implementing a Department approved Watershed Control/Protection Program.

(vii) a description of activities in the watershed that affect water quality, projects what adverse activities are expected to occur in the future, describes how the supplier of water expects to address them and otherwise complies with 310 CMR 22.20B(9) and 310 CMR 22.21(4), if applicable.

e. The supplier of water shall submit an annual report on Department approved forms to the Department. The annual report shall identify any special concerns about the watershed and how they are being handled;

6. The supplier of water shall be subject to an annual on-site inspection by the Department or a person designated by the Department to assess the Watershed Protection/Control Program and disinfection treatment process. A report of the on-site inspection which summarizes all findings must be prepared every year. The on-site inspection must indicate to the Department's satisfaction that the Watershed Protection/ Control Program and disinfection treatment process are adequately designed and maintained. The on-site inspection must include:

a. A review of the effectiveness of the Watershed Protection/ Control Program Plan;

b. A review of the physical condition of the source intake and how well it is protected;

c. A review of the system's equipment maintenance program to ensure there is low probability for failure of the disinfection process;

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d. An inspection of the disinfection equipment for physical deterioration;
e. A review of operating procedures;
f. A review of data records to ensure that all required tests are being conducted and recorded and disinfection is effectively practiced; and
g. Identification of any improvements which are needed in the equipment, system maintenance and operation, or data collection.

7. The public water system must not have been identified as a source of a waterborne disease outbreak, or if it has been so identified, the system must have been modified sufficiently to prevent another such occurrence, as determined by the Department.

8. A supplier of water must comply with the maximum contaminant level (MCL) for total coliform in 310 CMR 22.05(8) at least 11 months of the 12 previous months that the system served water to the public, on an ongoing basis, unless the Department determines that failure to meet this requirement was not caused by a deficiency in treatment of the source water.

9. Each supplier of water shall comply with the requirements for trihalomethanes in 310 CMR 22.07(1) and 310 CMR 22.07(2) until December 31, 2001. After January 1, 2002, the public water system shall comply with the requirements for total trihalomethanes, haloacetic acids (five), bromate, chlorite, chlorine, chloramines and chlorine dioxide as appropriate or applicable depending on disinfectant used and in accordance with 310 CMR 22.07E.

(c) Treatment Technique Violations.

1. A supplier of water shall be deemed in violation of a treatment technique requirement if it:
a. fails to meet any one of the criteria in 310 CMR 22.20A(2)(a) or 310 CMR 22.20A(2)(b) and/or which the Department has notified in writing that filtration is required or
b. fails to install filtration by the date specified in 310 CMR 22.20A(2).

2. A supplier of water that has not installed filtration is in violation of a treatment technique requirement if:
a. the turbidity level (measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(b)2.) in a representative sample of the source water immediately prior to the first or only point of disinfection exceeds 1 NTU unless five or fewer NTU units have been allowed by the Department, or
b. its system is identified as a source of a waterborne disease outbreak.

(3) Disinfection. A supplier of water that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in 310 CMR 22.20A(3)(a) beginning December 29, 1991, unless the Department notifies it in writing that filtration is required. A supplier of water that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in 310 CMR 22.20A(3)(a) beginning December 29, 1991, or 18 months after the Department determines that the ground water source is under the influence of surface water, whichever is later, unless the Department has notified it in writing that filtration is required. If the Department has determined that filtration is required, the supplier of water must comply with any interim disinfection requirements the Department deems necessary before filtration is installed. A supplier of water that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in 310 CMR 22.20A(3)(b) beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A supplier of water that uses a ground water source under the direct influence of surface water and provides filtration treatment must provide disinfection treatment as specified in 310 CMR 22.20A(3)(b) by June 29, 1993, or beginning when filtration is installed, whichever is later. Failure to meet any requirement in 310 CMR 22.20A(3) after the applicable date is a treatment technique violation.

(a) Disinfection requirements for public water systems that do not provide filtration. A supplier of water that does not provide filtration treatment must provide disinfection treatment as follows:

1. The disinfection treatment must be sufficient to ensure at least 99.9% (3-log) inactivation of *Giardia lamblia* cysts and 99.99% (4-log) inactivation of viruses, every day the system serves water to the public, except any one day each month. Each day a system serves water to the public, the supplier of water must calculate the CT value(s)

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from the system's treatment parameters, using the procedure specified in 310 CMR 22.20A(5)(b)3., and determine whether this value(s) is sufficient to achieve the specified inactivation rates for *giardia lamblia* cysts and viruses. If a system uses a disinfectant other than chlorine, the supplier of water may demonstrate to the Department, through the use of a Department-approved protocol for on-site disinfection challenge studies or other information satisfactory to the Department, that $CT_{99.9}$ values other than those specified in Tables 2.1-22.20A and 3.1-22.20A in 310 CMR 22.20A(5)(b)3. or other operational parameters are adequate to demonstrate that the system is achieving the minimum inactivation rates required by 310 CMR 22.20A(3)(a).

2. The disinfection system must have redundant components, including an auxiliary power supply with automatic start-up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system unless otherwise approved by the Department.

3. The residual disinfectant concentration in the water entering the distribution system, measured as specified in 310 CMR 22.20A(5)(a)5. and 310 CMR 22.20A(5)(b)5., cannot be less than 0.2 mg/l for more than four hours.

4. The residual disinfectant concentration in the distribution system measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in 310 CMR 22.20A(5)(a)5. and 310 CMR 22.20A(5)(b)6., cannot be undetectable in more than 5% of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in 310 CMR 22.20A(5)(a)3., is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5% in one month, for any two consecutive months.

$$V = \frac{c + d + e}{a + b} \times 100$$

where:

a = number of instances where the residual disinfectant concentration is measured;

b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d = number of instances where residual disinfectant concentration is detected and where the HPC is >500/ml; and

e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

(b) Disinfection requirements for public water systems which provide filtration. A supplier of water that provides filtration treatment must provide disinfection treatment as follows:

1. The disinfection treatment must be sufficient to ensure that the total treatment processes of that system achieve at least 99.9% (3-log) inactivation and/or removal of *Giardia lamblia* cysts and at least 99.99% (4-log) inactivation and/or removal of viruses, as determined by the Department.

2. The residual disinfectant concentration in the water entering the distribution system, measured as specified in 310 CMR 22.20A(5)(a)5. and 310 CMR 22.20A(5)(c)2., cannot be less than 0.2 mg/l for more than four hours.

3. The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in 310 CMR 22.20A(5)(a)5. and 310 CMR 22.20A(5)(c)3., cannot be undetectable in more than 5% of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in 310 CMR 22.20A(5)(a)3., is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus the value "V" in the following formula cannot exceed 5% in one month, for any two consecutive months.

$$V = \frac{c + d + e}{a + b} \times 100$$

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where:
a = number of instances where the residual disinfectant concentration is measured;
b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;
d = number of instances where no residual disinfectant concentration is detected and where the HPC is >500/ml; and
e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

(4) Filtration. A supplier of water that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in 310 CMR 22.20A(2)(a) and 310 CMR 22.20A(2)(b) for avoiding filtration, must provide treatment consisting of both disinfection, as specified in 310 CMR 22.20A(3)(b), and filtration treatment which complies with the requirements of 310 CMR 22.20A(4) by June 29, 1993, or within 18 months of the failure to meet any one of the criteria for avoiding filtration in 310 CMR 22.20A(2)(a) and 310 CMR 22.20A(2)(b), whichever is later. Failure to meet any requirement of 310 CMR 22.20A after the date specified in 310 CMR 22.20A(4) is a treatment technique violation.

(a) Conventional Filtration Treatment or Direct Filtration.

1. For systems using conventional filtration or direct filtration until December 31, 2001, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.5 NTU in at least 95% of the measurements taken each month, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.

2. The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.

3. Beginning January 1, 2002, systems using conventional and direct filtration treatment serving at least 10,000 people shall meet the turbidity requirements in 310 CMR 22.20D(4) and (5).

(b) Slow Sand Filtration.

1. For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95% of the measurements taken each month, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.

2. The turbidity level of representative samples of a system's filtered water must at no time exceed five NTU, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.

(c) Diatomaceous Earth Filtration.

1. For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to one NTU in at least 95% of the measurements taken each month, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.

2. The turbidity level of representative samples of a system's filtered water must at no time exceed five NTU, measured as specified in 310 CMR 22.20A(5)(a)4. and 310 CMR 22.20A(5)(c)1.

(d) Other Filtration Technologies. Each supplier of water may use a filtration technology not listed in 310 CMR 22.20A(4)(a) through (c), if it demonstrates to the Department, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of 310 CMR 22.20A(3)(b), consistently achieves 99.9% removal and/or inactivation of *Giardia lamblia* cysts and 99.99% removal and/or inactivation of viruses. For a supplier of water that makes this demonstration, the requirements of 310 CMR 22.20A(3)(b) apply. Beginning January 1, 2002, a supplier of water serving at least 10,000 people shall meet the requirements for other filtration technologies as required in 310 CMR 22.20D(4)(b). Beginning January 14, 2005, a supplier of water serving fewer than 10,000 people must meet the requirements for other filtration technologies as required in 310 CMR 22.20F(6)(c).

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(5) Analytical and Monitoring Requirements.

(a) Analytical Requirements. Only the analytical method(s) specified in 310 CMR 22.20A(5)(a), or otherwise approved by EPA, may be used to demonstrate compliance with the requirements of 310 CMR 22.20A(2), 310 CMR 22.20A(3), and 310 CMR 22.20A(4). Measurements for pH, temperature, turbidity, and residual disinfectant concentrations must be conducted by a certified operator. Measurements for total coliform, fecal coliform, and HPC must be conducted by a laboratory certified by the Department to do such analyses. The following procedures shall be performed in accordance with the publications listed in the 310 CMR 22.20A(6). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the methods published in *Standard Methods for the Examination of Water and Wastewater* may be obtained from the American Public Health Association, 1015 Fifteenth Street, N.W., Washington, D.C. 20005; copies of the Minimal Medium ONPG-MUG Method as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliform and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg *et al.*), Applied and Environmental Microbiology, Volume 54, pp.1594-1601, June 1988 (as amended under Erratum, Applied and Environmental Microbiology, Volume 54, p. 3197, December 1988), may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, Colorado, 80235; and copies of the Indigo Method as set forth in the article "Determination of Ozone in Water by the Indigo Method" (Bader and Hoigne), may be obtained from *Ozone Science & Engineering*, Pergamon Press Ltd., Fairview Park, Elmsford, New York 10523. Copies may be inspected at the U.S. Environmental Protection Agency, Room EB15, 401 M Street, S.W., Washington, D.C. 20460 or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700 Washington, D.C.

1. Public water systems must conduct analysis of pH and temperature in accordance with one of the methods listed in 310 CMR 22.06B(10). Public water systems must conduct analysis of total coliforms, fecal coliforms, Heterotrophic bacteria, and turbidity in accordance with one of the following analytical methods and by using analytical test procedures contained in *Technical Notes on Drinking Water Methods*, EPA-600/R-94-173. October 1994, which is available at NTIS PB95-104766.

Organism	Methodology	Citiation[1]
Total Coliform[2]	Total Coliform Fermentation Technique[3,4,5]	9221 A, B, C
	Total Coliform Membrane Filter Technique[6]	9222 A, B, C
	ONPG-MUG Test[7]	9223
Fecal Coliforms[2]	Fecal Coliform Procedure[8]	9221 E
	Fecal Coliform Filter Procedure	9222 D
Heterotrophic bacteria[2]	Pour Plate Method	9215 B
Turbidity	Nephelometric Method	2130 B
	Nephelometric Method	180.1[9]
	Great Lakes Instruments	Method 2[10]

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1, 6, 7, 9 and 10 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800–426–4791. Documents may be inspected at EPA's Drinking Water Docket, 1200 Pennsylvania Ave., NW., Washington, DC 20460 (Telephone: 202–260–3027); or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, D.C. 20408.

[1] Except where noted, all methods refer to *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), or 20th edition (1998), American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. The cited methods published in any of these three editions may be used.

[2] The time from sample collection to initiation of analysis may not exceed eight hours. Systems must hold samples below 10C during transit.

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[3] Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between this medium and lauryl tryptose broth using the water normally tested, and this comparison dem-onstrates that the false-positive rate and false-negative rate for total coliform, using lactose broth, is less than 10%.

[4] Media should cover inverted tubes at least ½ to ⅔ after the sample is added.

[5] No requirement exists to run the completed phase on 10% of all total coliform-positive confirmed tubes.

[6] MI agar also may be used. Preparation and use of MI agar is set forth in the article, ''New medium for the simultaneous detection of total coliform and Escherichia coli in water'' by Brenner, K.P., et al., 1993, Appl. Environ. Microbiol. 59:3534–3544. Also available from the Office of Water Re-source Center (RC–4100), 1200 Pennsylvania Ave., NW., Washington, DC 20460, EPA 600/J–99/225.

[7] The ONPG–MUG Test is also known as the Autoanalysis Colilert System.

[8] A–1 Broth may be held up to three months in a tightly closed screw cap tube at 4°C.

[9] ''Methods for the Determination of Inorganic Substances in Environmental Samples'', EPA/600/R–93/100, August 1993. Available at NTIS, PB94–121811.

[10] GLI Method 2, ''Turbidity'', November 2, 1992, Great Lakes Instruments, Inc., 8855 North 55th Street, Milwaukee, Wisconsin 53223.

2. Public water systems must measure residual disinfectant concentrations with one of the following methods in the following table. Except for the method for ozone residuals, the disinfectant residual methods are contained in the 18th, 19th, and 20th editions of *Standard Methods for the Examination of Water and Wastewater*, 1992, 1995, and 1998; the cited methods published in any of these three editions may be used. The ozone method, 4500-O_3 B, is contained in both the 18th and 19th editions of *Standard Methods for the Examination of Water and Wastewater*, 1992,1995; either edition may be used. Residual disinfectant concentrations for free chlorine and combined chlorine also may be measured by using digital meter versions of DPD colorimetric test kits. Suppliers serving less than or equal to 3300 persons may use non-digital meter DPD colorimetric test kits. Free chlorine and total chlorine may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument provided the chemistry, accuracy, and precision remain the same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five days, or with a protocol approved by the Department.

Residual	Methodology	Methods
Free Chlorine	Amperometric Titration	4500-Cl D
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
	Syringaldazine (FACTS)	4500-Cl H
Total Chlorine	Amperometric Titration	4500-Cl D
	Amperometric Titration (low level measurement)	4500-Cl E
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
	Iodometric Electrode	4500-Cl I
Chlorine Dioxide	Amperometric Titration	4500-ClO_2 C
	DPD Method	4500-ClO_2 D
	Amperometric Titration	4500-ClO_2 E
Ozone	Indigo Method	4500-O_3 B

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(b) Monitoring Requirements for Systems that Do Not Provide Filtration. A supplier of water that uses a surface water source and does not provide filtration treatment must begin monitoring, as specified in 310 CMR 22.20A(5)(b) beginning May 1, 1990, unless the Department has notified it in writing that filtration is required, in which case the Department may specify alternative monitoring requirements, as appropriate, until filtration is in place. A supplier of water that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must begin monitoring as specified in 310 CMR 22.20A(5)(b) beginning December 31, 1990 or six months after the Department determines that the ground water source is under the direct influence of surface water, whichever is later, unless the Department has notified it in writing that filtration is required, in which case the Department may specify alternative monitoring requirements, as appropriate, until filtration is in place.

1. Fecal coliform or total coliform density measurements as required by 310 CMR 22.20A(2)(a)1. must be performed on representative source water samples immediately prior to the first or only point of disinfectant application. The supplier of water must sample for fecal or total coliform at the following minimum frequency each week the system serves water to the public:

System Size (Persons Served)	Samples/Week[1]
< 500	1
501- 3,300	2
3,301-10,000	3
10,001-25,000	4
>25,000	5

[1] Must be taken on separate days.

In addition, one fecal or total coliform density measurement must be made every day the system serves water to the public and the turbidity of the source water exceeds 1 NTU (these samples count towards the weekly coliform sampling requirement) unless the Department determines that the supplier of water for logistical reasons outside of the supplier's control, cannot have the sample analyzed within 30 hours of collection.

2. Turbidity measurements as required by 310 CMR 22.20A(2)(a)2. must be performed on representative grab samples of source water immediately prior to the first or only point of disinfectant application every four hours (or more frequently) that the system serves water to the public. A supplier of water may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the Department.

3. The total inactivation ratio for each day that the system is in operation must be determined based on the $CT_{99.9}$ values in Tables 1.1 - 22.20A through 1.6-22.20A, 2.1-22.20A and 3.1-22.20A in 310 CMR 22.20A(5)(b)3. as appropriate. The parameters necessary to determine the total inactivation ratio must be monitored as follows:

22.20A: continued

a. The temperature of the disinfected water must be measured at least once per day at each residual disinfectant concentration sampling point.
b. If the system uses chlorine, the pH of the disinfected water must be measured at least once per day at each chlorine residual disinfectant concentration sampling point.
c. The disinfectant contact time(s) ("T") must be determined for each day during peak hourly flow.
d. The residual disinfectant concentration(s) ("C") of the water before or at the first customer must be measured each day during peak hourly flow.
e. If a system uses a disinfectant other than chlorine, the system may demonstrate to the Department, through the use of a Department-approved protocol for on-site disinfection challenge studies or other information satisfactory to the Department, that $CT_{99.9}$ values other than those specified in Tables 2.1-22.20A and 3.1-22.20A in 310 CMR 22.20A(5)(b)3. are adequate to demonstrate that the system is achieving the minimum inactivation rates required by 310 CMR 22.20A(3)(a)1.

TABLE 1.1 - 310 CMR 22.20A
CT VALUES ($CT_{99.9}$) FOR 99.9% INACTIVATION OF
GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 0.5°C OR LOWER*

	Free Residual	pH						
	(mg/l)	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤	0.4	137	163	195	237	277	329	390
	0.6	141	168	200	239	286	342	407
	0.8	145	172	205	246	295	354	422
	1.0	148	176	210	253	304	365	437
	1.2	152	180	215	259	313	376	451
	1.4	155	184	221	266	321	387	464
	1.6	157	189	226	273	329	397	477
	1.8	162	193	231	279	338	407	489
	2.0	165	197	236	286	346	417	500
	2.2	169	201	242	297	353	426	511
	2.4	172	205	247	298	361	435	522
	2.6	175	209	252	304	368	444	533
	2.8	178	213	257	310	375	452	543
	3.0	181	217	261	316	382	460	552

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

22.20A: continued

TABLE 1.2 - 310 CMR 22.20A
CT VALUES ($CT_{99.9}$) FOR 99.9% INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 5.0°C*

Free Residual (mg/l)	pH ≤ 6.0	6.5	7.0	7.5	8.0	8.5	< 9.0
≤ 0.4	97	117	139	166	198	236	279
0.6	100	120	143	171	204	244	291
0.8	103	122	146	175	210	252	301
1.0	105	125	149	179	216	260	312
1.2	107	127	152	183	221	267	320
1.4	109	130	155	187	227	274	329
1.6	111	132	158	192	232	281	337
1.8	114	135	162	196	238	287	345
2.0	116	138	165	200	243	294	353
2.2	118	140	169	204	248	300	361
2.4	120	143	172	209	253	306	368
2.6	122	146	175	213	258	312	375
2.8	124	148	178	217	263	318	382
3.0	126	151	182	221	268	324	389

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature, and at the higher pH.

TABLE 1.3 - 310 CMR 22.20A
CT VALUES ($CT_{99.9}$) FOR 99.9% INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 10°C*

Free Residual (mg/l)	pH ≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤ 0.4	73	88	104	125	149	177	209
0.6	75	90	107	128	153	183	218
0.8	78	92	110	131	158	189	226
1.0	79	94	112	134	162	195	234
1.2	80	95	114	137	166	200	240
1.4	82	98	116	140	170	206	247
1.6	83	99	119	144	174	211	253
1.8	86	101	122	147	179	215	259
2.0	87	104	124	150	182	221	265
2.2	89	105	127	153	186	225	271
2.4	90	107	129	157	190	230	276
2.6	92	110	131	160	194	234	281
2.8	93	111	134	163	197	239	287
3.0	95	113	137	166	201	243	292

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature, and at the higher pH.

22.20A: continued

TABLE 1.4 - 310 CMR 22.20A
CT VALUES ($CT_{99.9}$) FOR 99.9% INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 15°C*

Free Residual (mg/l)	pH ≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤ 0.4	49	59	70	83	99	118	140
0.6	50	60	72	86	102	122	146
0.8	52	61	73	88	105	126	151
1.0	53	63	75	90	108	130	156
1.2	54	64	76	92	111	134	160
1.4	55	65	78	94	114	137	165
1.6	56	66	79	96	116	141	169
1.8	57	68	81	98	119	144	173
2.0	58	69	83	100	122	147	177
2.2	59	70	85	102	124	150	181
2.4	60	72	86	105	127	153	184
2.6	61	73	88	107	129	156	188
2.8	62	74	89	109	132	159	191
3.0	63	76	91	111	134	162	195

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature, and at the higher pH.

TABLE 1.5 - 310 CMR 22.20A
CT VALUES ($CT_{99.9}$) FOR 99.9% INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 20°C*

Free Residual (mg/l)	pH ≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤ 0.4	36	44	52	62	74	89	105
0.6	38	45	54	64	77	92	109
0.8	39	46	55	66	79	95	113
1.0	39	47	56	67	81	98	117
1.2	40	48	57	69	83	100	120
1.4	41	49	58	70	85	103	123
1.6	42	50	59	72	87	105	126
1.8	43	51	61	74	89	108	129
2.0	44	52	62	75	91	110	132
2.2	44	53	63	77	93	113	135
2.4	45	54	65	78	95	115	138
2.6	46	55	66	80	97	117	141
2.8	47	56	67	81	99	119	143
3.0	47	57	68	83	101	122	146

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature, and at the higher pH.

22.20A: continued

TABLE 1.6 - 310 CMR 22.20A
CT VALUES ($CT_{99.9}$) FOR 99.9% INACTIVATION OF *GIARDIA LAMBLIA* CYSTS BY FREE CHLORINE AT 25°C* AND HIGHER

Free Residual	pH						
(mg/l)	≤ 6.0	6.5	7.0	7.5	8.0	8.5	≤ 9.0
≤ 0.4	24	29	35	42	50	59	70
0.6	25	30	36	43	51	61	73
0.8	26	31	37	44	53	63	75
1.0	26	31	37	45	54	65	78
1.2	27	32	38	46	55	67	80
1.4	27	33	39	47	57	69	82
1.6	28	33	40	48	58	70	84
1.8	29	34	41	49	60	72	86
2.0	29	35	41	50	61	74	88
2.2	30	35	42	51	62	75	90
2.4	30	36	43	52	63	77	92
2.6	31	37	44	53	65	78	94
2.8	31	37	45	54	66	80	96
3.0	32	38	46	55	67	81	97

* These CT values achieve greater than a 99.99% inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature, and at the higher pH.

TABLE 2.1 - 310 CMR 22.20A
CT VALUES ($CT_{99.9}$) FOR 99.9% INACTIVATION OF
GIARDIA LAMBLIA CYSTS BY CHLORINE DIOXIDE AND OZONE*

	Temperature					
	≤ 1°C	5°C	10°C	15°C	20°C	≥ 25°C
Chlorine dioxide	63	26	23	19	15	11
Ozone	2.9	1.9	1.4	0.95	0.72	0.48

* These CT values achieve greater than 99.99% inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature for determining $CT_{99.9}$ values between indicated temperatures.

TABLE 3.1 - 310 CMR 22.20A
CT VALUES ($CT_{99.9}$) FOR 99.9% INACTIVATION
OF *GIARDIA LAMBLIA* CYSTS BY CHLORAMINE*

Temperature					
≤ 1°C	5°C	10°C	15°C	20°C	≥ 25°C
3,800	2,200	1,850	1,500	1,100	750

* These values are for pH values of 6 to 9. These CT values may be assumed to achieve greater than 99.99% inactivation of viruses only if chlorine is added and mixed in the water prior to the addition of ammonia. If this condition is not met, the system must demonstrate, based on on-site studies or other information, as approved by the State, that the system is achieving at least 99.99% inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature for determining $CT_{99.9}$ values between indicated temperatures.

22.20A: continued

4. The total inactivation ratio must be calculated as follows:

a. If the system uses only one point of disinfectant application, the supplier of water may determine the total inactivation ratio based on either of the following two methods:

(i) One inactivation ratio ($CTcalc/CT_{99.9}$) is determined before or at the first customer during peak hourly flow and if the $CTcalc/CT_{99.9} \geq 1.0$, the 99.9% *Giardia lamblia* inactivation requirement has been achieved; or

(ii) Successive $CTcalc/CT_{99.9}$ values, representing sequential inactivation ratios, are determined between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the following method must be used to calculate the total inactivation ratio:

(A) Determine $\frac{CTcalc}{CT_{99.9}}$ for each sequence

.

(B) Add the $\frac{(CTcalc)}{(CT_{99.9})}$ values together $\frac{(CTcalc)}{(CT_{99.9})}$

(C) If $\frac{(CTcalc)}{CT_{99.9}} \geq 1.0$, then the 99.9% *Giardia lamblia* inactivation requirement has been achieved.

b. If the system uses more than one point of disinfectant application before or at the first customer, the supplier of water must determine the CT value of each disinfection sequence immediately prior to the next point of disinfectant application during peak hourly flow. The $CTcalc/CT_{99.9}$ value of each sequence and

$$\frac{CTcalc}{CT_{99.9}}$$

must be calculated using the method in 310 CMR 22.20A(5)(b)4.a.(ii) to determine if the supplier of water is in compliance with 310 CMR 22.20A(3)(a).

c. Although not required, the total percent inactivation for a system with one or more points of residual disinfectant concentration following equation:

$$Percent\ Inactivation + 100 - \frac{100}{10^z}$$

$$where\ z = 3\ x \sum \frac{(CTcalc)}{(CT_{99.9})}$$

5. The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment. Systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies prescribed below:

System size by population	Samples/day*
≤ 500	1
501-1,000	2
1,001-2,500	3
2,501-3,300	4

* The day's samples cannot be taken at the same time. The sampling intervals are subject to Department review and approval.

22.20A: continued

If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the supplier of water must take a grab sample every four hours until the residual concentration is equal to or greater than 0.2 mg/l.

6. The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliform are sampled, as specified in 310 CMR 22.05, except that the Department may allow a supplier of water which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source, to take disinfectant residual samples at points other than the total coliform sampling points if the Department determines that such points are more representative of treated (disinfected) water quality within the distribution system.

a. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in 310 CMR 22.20A(5)(a)3., may be measured in lieu of residual disinfectant concentration.

(c) Monitoring requirements for systems using filtration treatment. A supplier of water that uses a surface water source or a ground water source under the influence of surface water and provides filtration treatment must monitor in accordance with 310 CMR 22.20A(5)(c) beginning June 29, 1993, or when filtration is installed, whichever is later.

1. Turbidity measurements as required by 310 CMR 22.20A(4) must be performed on representative samples of the system's filtered water every four hours (or more frequently) that the system serves water to the public. A supplier of water may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the Department. For any systems using slow sand filtration, the Department may reduce the sampling frequency to no less than once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance.

2. The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment. Systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:

System size by population	Samples/day*
≤500	1
501-1,000	2
1,001-2,500	3
2,501-3,300	4

* The day's samples cannot be taken at the same time. The sampling intervals are subject to Department review and approval.

If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the supplier of water must take a grab sample every four hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/l.

3. The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliform are sampled, as specified in 310 CMR 22.05, except that the Department may allow a supplier of water which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source to take disinfectant residual samples at points other than the total coliform sampling points if the Department determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in 310 CMR 22.20A(5)(a)3., may be measured in lieu of residual disinfectant concentration.

22.20A: continued

(6) Reporting and Recordkeeping Requirements.

(a) A supplier of water that uses a surface water source and does not provide filtration treatment must report monthly to the Department the information specified in 310 CMR 22.20A(6)(a) beginning May 1, 1990, unless the Department has notified the supplier of water in writing that filtration is required in writing, in which case the Department may specify alternative reporting requirements, as appropriate, until filtration is in place. A supplier of water that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must report monthly to the Department the information specified in 310 CMR 22.20A(6)(a) beginning December 31, 1990 or six months after the Department determines that the ground water source is under the direct influence of surface water, whichever is later, unless the Department has notified it in writing that filtration is required in which case the Department may specify alternative reporting requirements, as appropriate, until filtration is in place.

1. Source water quality information must be reported to the Department within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

a. The cumulative number of months for which results are reported.

b. The number of fecal and/or total coliform samples, whichever are analyzed during the month (if a system monitors for both, only fecal coliform must be reported), the dates of sample collection, and the dates when the turbidity level exceeded one NTU.

c. The number of samples during the month that had equal to or less than 20/100 ml fecal coliform and/or equal to or less than 100/100 ml total coliform, whichever are analyzed.

d. The cumulative number of fecal or total coliform samples, whichever are analyzed, during the previous six months the system served water to the public.

e. The cumulative number of samples that had equal to or less than 20/100 ml fecal coliform or equal to or less than 100/100 ml total coliform, whichever are analyzed, during the previous six months the system served water to the public.

f. The percentage of samples that had equal to or less than 20/100 ml fecal coliform or equal to or less than 100/100 ml total coliform, whichever are analyzed, during the previous six months the system served water to the public.

g. The maximum turbidity level measured during the month, the date(s) of occurrence for any measurement(s) which exceeded five NTU, and the date(s) the occurrence(s) was reported to the Department.

h. For the first 12 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded five NTU, and after one year of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded five NTU in the previous 12 months the system served water to the public.

i. For the first 120 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded five NTU, and after ten years of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded five NTU in the previous 120 months the system served water to the public.

2. Disinfection information specified in 310 CMR 22.20A(5)(b) must be reported to the Department within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

a. For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.

b. The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the Department was notified of the occurrence.

c. The daily residual disinfectant concentration(s) (in mg/l) and disinfectant contact time(s) (in minutes) used for calculating the CT value(s).

d. If chlorine is used, the daily measurement(s) of pH of disinfected water following each point of chlorine disinfection.

e. The daily measurement(s) of water temperature in °C following each point of disinfection.

22.20A: continued

f. The daily CTcalc and $CTcalc/CT_{99.9}$ values for each disinfectant measurement or sequence and the sum of all $CTcalc/CT_{99.9}$ values ($(CTcalc/CT_{99.9})$) before or at the first customer.

g. The daily determination of whether disinfection achieves adequate *Giardia* cyst and virus inactivation, i.e., whether ($CTcalc/CT_{99.9}$) is at least 1.0 or, where disinfectants other than chlorine are used, other indicator conditions that the Department determines are appropriate, are met.

h. The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to 310 CMR 22.20A(3):

(i) Number of instances where the residual disinfectant concentration is measured;

(ii) Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

(iii) Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

(iv) Number of instances where the residual disinfectant concentration is detected and where HPC is >500/ml;

(v) Number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml;

(vi) For the current and previous month the system served water to the public, the value of "V" in the following formula:

$$V = \frac{c + d + e}{a + b} \times 100$$

where

a = the value in 310 CMR 22.20A(6)(a)2.h.(i).
b = the value in 310 CMR 22.20A(6)(a)2.h.(ii)
c = the value in 310 CMR 22.20A(6)(a)2.h.(iii)
d = the value in 310 CMR 22.20A(6)(a)2.h.(iv)
e = the value in 310 CMR 22.20A(6)(a)2.h.(v)

i. A system need not report the data listed in 310 CMR 22.20A(6)(a)2.a., and 310 CMR 22.20A(6)(a)2.c. through 310 CMR 22.20A(6)(a)2.f. if all data listed in 310 CMR 22.20A(6)2.a. through 310 CMR 22.20A(6)(a)2.f. remains on file at the system, and the Department determines that:

(i) The supplier of water has submitted to the Department all the information required by 310 CMR 22.20A(6)(a)2.a. through 310 CMR 22.20A(6)(a)2.h. for at least 12 months; and

(ii) The Department has determined that the system is not required to provide filtration treatment.

3. No later than January 10th of each year, each supplier of water must provide to the Department a report which summarizes its compliance with all watershed control program requirements specified in 310 CMR 22.20A(2)(b)5.

4. No later than January 10th of each year each system must provide to the Department a report on the on-site inspection conducted during that year pursuant to 310 CMR 22.20A(2)(b)6. unless the on-site inspection was conducted by the Department.

5. Each supplier of water, upon discovering that a waterborne disease outbreak potentially attributable to its water system has occurred, must report that occurrence to the Department as soon as possible, but no later than by the end of the next business day.

6. If at any time the turbidity exceeds five NTU, the supplier of water must consult with the Department as soon as practical, but not later than 24 hours after the exceedance is known, in accordance with the public notification requirements under 310 CMR 22.16(3)(b)3.

7. If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the supplier of water must notify the Department as soon as possible, but no later than by the end of the next business day. The supplier of water also must notify the Department by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within four hours.

(b) A supplier of water that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment must report monthly to the Department the information specified in 310 CMR 22.20A(6)(b) beginning June 29, 1993, or when filtration is installed, whichever is later.

22.20A: continued

1. Turbidity measurements as required by 310 CMR 22.20A(5)(c)1. must be reported within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

a. The total number of filtered water turbidity measurements taken during the month.

b. The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in 310 CMR 22.20A(4) for the filtration technology being used.

c. The date and value of any turbidity measurements taken during the month which exceed five NTU.

2. Disinfection information specified in 310 CMR 22.20A(5)(c) must be reported to the Department within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

a. For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.

b. The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the Department was notified of the occurrence.

c. The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to 310 CMR 22.20A(3):

(i) Number of instances where the residual disinfectant concentration is measured;

(ii) Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

(iii) Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

(iv) Number of instances where no residual disinfectant concentration is detected and where HPC is >500/ml;

(v) Number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml;

(vi) For the current and previous month the system serves water to the public, the value of "V" in the following formula:

$$V = \frac{c + d + e}{a + b} \times 100$$

where

a = the value in 310 CMR 22.20A(6)(b)2.c.(i)

b = the value in 310 CMR 22.20A(6)(b)2.c.(ii)

c = the value in 310 CMR 22.20A(b)2.c.(iii)

d = the value in 310 CMR 22.20A(b)2.c.(iv)

e = the value in 310 CMR 22.20A(b)2.c.(v)

d. A supplier of water need not report the data listed in 310 CMR 22.20A(6)(b)2.a. if all data listed in 310 CMR 22.20A(6)(b)2.a. through 310 CMR 22.20A(6)(b)2.c. remains on file at the system and the Department determines that the system has submitted all the information required by 310 CMR 22.20A(6)(b)2.a. through 310 CMR 22.20A(6)(b)2.c. for at least 12 months.

3. A supplier of water, upon discovering that a waterborne disease outbreak potentially attributable to its water system has occurred, must report that occurrence to the Department as soon as possible, but no later than by the end of the next business day.

4. If at any time the turbidity exceeds five NTU, the supplier of water must consult with the Department as soon as practical, but not later than 24 hours after the exceedance is known, in accordance with the public notification requirements under 310 CMR 22.16(3)(b)3.

5. If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the supplier of water must notify the Department as soon as possible, but no later than by the end of the next business day. The system also must notify the Department by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within four hours.

22.20A: continued

(7) Review of Filtration Determinations

(a) The Department's determination whether a supplier of water must provide filtration will be made in writing based on the criteria set forth in 310 CMR 22.20A(2). The supplier of water shall publish a copy of the Department's determination in a newspaper of general circulation in the area served by the supplier of water within ten days of receipt of the same. The determination will include a statement that the supplier of water and persons served by the system may request a hearing in accordance with 310 CMR 22.20A(7)(b). Within ten days of publication, the supplier of water shall submit an affidavit to the Department attesting to the fact that the determination has been published.

(b) The supplier of water, and any person served by the system, may request review of the determination at a public hearing by submitting a written request to the Regional Director at the Department's Regional Office that serves the area where the public water system at issue is located within 15 days of the date of publication.

(c) Following receipt of a request for a public hearing, the Department will give notice of the hearing by mail to the supplier of water and, if the request was made by a person other than the supplier of water, to the person who submitted the request. The supplier of water shall publish a copy of the notice of hearing in a newspaper of general circulation in the area served by the system within ten days of receipt of the same. Within ten days of publication, the supplier of water shall submit an affidavit to the Department attesting to the fact that the notice has been published.

(d) The Department will accept written comments from the public relevant to the determination up to at least 14 days following the hearing. A determination following the hearing that a supplier of water must provide filtration will not be subject to further review; a determination that a supplier of water meets all of the criteria for avoiding filtration will be subject to the Department's on-going review. In the event the Department finds that a supplier of water no longer meets any one of the criteria for avoiding filtration, the Department will issue a determination in writing that will be subject to review at a public hearing in accordance with 310 CMR 22.20A(7).

22.20B: Surface Water Supply Protection

(1) To protect surface waters used as sources of drinking water supply from contamination, the requirements of 310 CMR 22.20B shall apply to Zones A, B, C of a surface water source, except at:

(a) Rivers and streams designated as Class B waters pursuant to 314 CMR 4.00 which are used as drinking water sources and are not impounded at some point by means of a dam or dike to create a reservoir at which the water supply intake is located;

(b) Emergency sources approved by the Department under the provisions of M.G.L. 21G.

(2) On and after January 1, 2001, a public water system shall prohibit the following new or expanded land uses within the Zone A of its surface water sources.

(a) All underground storage tanks,

(b) Above-ground storage of liquid hazardous material as defined in M.G.L. c.21E, or liquid propane or liquid petroleum products, except as follows:

1. The storage is incidental to:
   a. normal household use, outdoor maintenance, or the heating of a structure;
   b. use of emergency generators;
   c. a response action conducted or performed in accordance with M.G.L. c.21E and 310 CMR 40.000 and which is exempt from a ground water discharge permit pursuant to 314 CMR 5.05(14); and
2. The storage is either in container(s) or above-ground tank(s) within a building, or outdoors in covered container(s) or above-ground tank(s) in an area that has a containment system designed and operated to hold either 10% of the total possible storage capacity of all containers, or 110% of the largest container's storage capacity, whichever is greater. However, these storage requirements do not apply to the replacement of existing tanks or systems for the keeping, dispensing or storing of gasoline provided the replacement is performed in accordance with applicable state and local requirements;

22.20B: continued

(c) Treatment or disposal works subject to 314 CMR 3.00 or 5.00, except the following:
1. the replacement or repair of an existing treatment or disposal works that will not result in a design capacity greater than the design capacity of the existing treatment or disposal works;
2. treatment or disposal works for sanitary sewage if necessary to treat existing sanitary sewage discharges in non-compliance with Title 5, 310 CMR 15.00, provided the facility owner demonstrates to the Department's satisfaction that there are no feasible siting locations outside of the Zone A. Any such facility shall be permitted in accordance with 314 CMR 5.00 and shall be required to disinfect the effluent. The Department may also require the facility to provide a higher level of treatment prior to discharge;
3. treatment works approved by the Department designed for the treatment of contaminated ground or surface waters and operated in compliance with 314 CMR 5.05(3) or 5.05 (13).
4. discharge by public water system of waters incidental to water treatment processes.

(3) All on-site subsurface sewage disposal systems, as defined in 310 CMR 15.000 (Title 5), within Zones A, B, and C, shall be in compliance with the requirements of 310 CMR 15.000.

(4) No stabling, hitching, standing, feeding or grazing of livestock or other domestic animals shall be located, constructed, or maintained within 100 feet of the bank of a surface water source or tributary thereto. Owners and operators of agricultural operations should consult the Massachusetts Department of Food and Agriculture's "On-Farm Strategies to Protect Water Quality - An Assessment & Planning Tool for Best Management Practices" (December 1996) for information about technical and financial assistance programs related to erosion and sediment control and nutrient, pest, pesticide, manure, waste, grazing, and irrigation management.

(5) No burial shall be made, except by permission in writing by the Board of Water Commissioners or like body having jurisdiction over such source of supply, in any cemetery or other place within 100 feet of the high water mark of a source of public water supply or tributary thereto. No lands not under the control of cemetery authorities and used for cemetery purposes, from which lands the natural drainage flows into said source of water supply or tributary thereto, shall be taken or used for cemetery purposes until a plan and sufficient description of the lands is presented to the Department and until such taking or use is expressly approved in writing by the Department.

(6) No person shall swim, wade or bathe in any public surface water source and no person shall, unless permitted by written permit by the Board of Water Commissioners or like body having jurisdiction over such source , fish in; enter or go in any boat, seaplane, or other vehicle ; enter upon the ice for any purpose, including the cutting or taking of ice; or cause or allow any animal to go into, or upon, any surface water source or tributary thereto.

(7) Enforcement. A public water system has the following enforcement responsibilities with respect to protection of the Zone A, B, and C of its surface water source(s)
(a) A public water system shall conduct regular and thorough inspections of Zones A, B, and C to determine and enforce compliance with 310 CMR 22.20B. The public water system shall take prompt enforcement actions against persons violating 310 CMR 22.20B, and report all such enforcement actions to the Department in the system's Annual Statistical Report the results of the regular inspections made during the preceding calendar year. The report shall include the number and dates of the inspections , the number, nature and outcome of violations found, and enforced against by the public water system, and the general condition of the watershed at the time of the last inspection.
(b) the public water system shall document on a form provided by the Department and submitted to the Department in calendar year 2001, that the public water system has established a protocol that provides the system with an opportunity to review and comment on all proposed new or expanded land uses or activities within the watershed of its surface water source(s) to local boards, commissions and other authorities with primary responsibilities for approving such uses and activities.
(c) The Department may take enforcement actions against any public water system which fails to carry out its enforcement responsibilities under 310 CMR 22.20B, or may enforce directly against persons violating 310 CMR22.20B.

22.20B: continued

(8) No person shall apply herbicides to any surface water body including but not limited to any reservoir and their tributaries, which serve as a source of public water supply without a permit issued by the Department pursuant to M.G.L. c. 111, § 5E. This requirement does not apply to the application of algaecides containing copper by the public water system. However, the public water system shall notify the Department in writing prior to the application of such algaecides.

22.20C: Surface Water Supply Protection for New and Expanded Class A Surface Water Sources

(1) Source Approval.

(a) A public water system shall obtain prior written approval of the Department for:

1. the development of a new surface water source;
2. the physical expansion of an existing surface water source or the replacement or modification of an existing intake structure;
3. any increase in withdrawal from an existing surface water source in excess of the permitted threshold volume as defined in 310 CMR 36.00; or
4. placing an existing unapproved or inactive surface water on-line.

(b) Persons seeking Department approval for any of the activities described in 310 CMR 22.20C(1)(a) are required to follow the procedures set forth in the "Guidelines and Policies for Public Water System".

(c) In determining whether to grant such approval, the Department will apply the criteria set forth in 310 CMR 22.20C and the "Guidelines and Policies for Public Water Systems."

(d) The Department will not grant its approval pursuant to 310 CMR 22.20C(1), unless the public water system demonstrates to the Department's satisfaction that the system:

1. complies with the applicable "Guidelines and Policies for Public Water Systems",
2. meets all applicable water quality standards set forth in the Massachusetts Drinking Water Regulations, 310 CMR 22.00, and will meet the requirements of 310 CMR 22.20A,B, C;
3. has delineated and mapped Zones A, B and C of the proposed surface water source and provided a map depicting existing land uses existing within Zones A, B and C;
4. has developed a Surface Water Supply Protection Plan in accordance with the Department's "Guidelines and Policies for Public Water Systems" and "Developing a Local Surface Water Supply Protection Plan" (revised May 2000), which shall be updated by the public water system, with a copy submitted to the Department, every three years thereafter; and
5. has developed a reservoir and watershed public control plan, to specify allowable and non-allowable uses on existing public surface water sources and within adjacent public surface water supplier-owned lands at new and existing sources, and contains provisions for public education, inspection, and enforcement.
6. obtain a permit or permit amendment for any withdrawal, in accordance with the Water Management Act, M.G.L. c. 21G, and 310 CMR 36.00.

(e) Municipal Source.

1. No new municipal surface water source, or physical expansion of an existing surface water source shall be placed on line or allowed to expand, unless:

a. in the case of a Zone A contained entirely within the municipality, the municipality has adopted and has in effect surface water protection zoning or nonzoning controls that prohibit siting within the Zone A of each source the land uses set forth in 310 CMR 22.20C(2) unless the land uses are designed in accordance with the performance standards specified in 310 CMR 22.20C(2); and

b. in the case of a municipality or municipalities in which any part of the Zone A of a proposed or physically expanded municipal surface water source is located the municipality (or municipalities) has in effect zoning or nonzoning controls that prohibit siting within Zone A the land uses set forth in 310 CMR 22.20C(2) unless the land uses are designed in accordance with the performance standards established in 310 CMR 22.20C(2), or the municipal supplier of water demonstrates to the Department's satisfaction that it has used best efforts to have such zoning or nonzoning controls adopted and in effect; and

22.20C: continued

c. the municipality has submitted to the Department a copy of the adopted zoning or nonzoning controls, if any, including any local legislation that provides a variance, waiver or exemption process related to surface water protection zoning and nonzoning controls applicable to the Zone A of the municipal source.

2. An owner or operator of a municipal surface water source that will increase its withdrawal of water by more than the threshold volume, as defined in 310 CMR 36.00, shall, within two years of the effective date of a Water Management Act permit or permit amendment that authorizes the increase:

a. in the case of a Zone A contained entirely within the municipality, adopt and have in effect surface water protection zoning or nonzoning controls that prohibit siting within the Zone A of the source the land uses set forth in 310 CMR 22.20C(2), unless the land uses are designed in accordance with the performance standards specified in 310 CMR 22.20C(2);and

b. in the case of a municipality or municipalities in which any part of the Zone A of the source is located, have zoning or nonzoning controls in effect that prohibit the siting within the Zone A of land uses set forth in 310 CMR 22.20C(2), unless the land uses are designed in accordance with the performance standards specified in 310 CMR 22.20C(2), or have demonstrated to the Department's satisfaction that the municipal water supplier has used its best efforts to have the municipality or municipalities where the Zone A is located adopt zoning or nonzoning controls; and

c. submit to the department a copy of the zoning or nonzoning controls in effect and any local legislation that provides a variance or exemption process related the surface water protection zoning and nonzoning controls.

(f) Non-Municipal Sources. no new surface water source, or existing surface water source physically expanding, or increasing its withdrawal by more than the threshold volume as defined by 310 CMR 36.00, that will be used in a non-municipal public water system owned or operated by a non-municipal public water supplier shall demonstrate to the Department's satisfaction that it has used its best efforts to have all municipalities in which Zones A, B and C of the surface water source are located establish zoning or nonzoning controls that prohibit siting within Zones A, B and C the land uses set forth in 310 CMR 22.20C(2), unless the land uses are designed in accordance with the performance standards specified therein.

(g) The proponent may meet the requirements set forth in 310 CMR 22.20C(1)(e) and 310 CMR 22.20C(1)(f) by demonstrating that the water supplier has acquired land for water supply purposes or the existing rights in perpetuity or for a specific period of years stated in the form of a restriction, easement, covenant or condition in a deed or other instrument, or other mechanism approved by the Department, prohibiting the siting within Zone A of the land uses set forth in 310 CMR 22.20C(2).

(h) Amendment or Repeal of Zoning/Nonzoning Controls: no public water system surface water source shall remain on-line more than 120 days following the amendment or repeal of surface water protection zoning or nonzoning controls protecting that surface water source, or the expiration of any rights stated in a deed or other instrument approved pursuant to 310 CMR 22.20C(1)(g), unless the Department finds in writing that the water supplier meets the requirements set forth in 310 CMR 22.20C(1)(e) or 310 CMR 22.20C(1)(f), whichever is applicable, or grants a variance in accordance with 310 CMR 22.20C(3).

(i) Water Supply Emergency. the Department may exempt a water supplier from any of the requirements set forth in 310 CMR 22.20C(1) while a declaration of a state of water supply emergency pursuant to M.G.L. Ch.21G is in effect. In the event that the Department declares a state of water supply emergency, the surface water source shall operate, for the duration of the state of water supply emergency, as directed by the Department.

(2) Restricted Activities Upon Surface Water Sources and Within Protection Zones. Required Surface Water Protection Controls Applicable to Zone A: Surface water protection zoning and nonzoning controls submitted to the Department in accordance with 310 CMR 22.20C(1), shall collectively prohibit the siting of the following new land uses within Zone A:

(a) land uses described in 310 CMR 22.20B(2);

(b) facilities that, through their acts or processes, generate, treat, store or dispose of hazardous waste that are subject to M.G.L. c. 21C and 310 CMR 30.000, except for the following:

1. very small quantity generators, as defined by 310 CMR 30.000;

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2. treatment works approved by the Department designed in accordance with 314 CMR 5.00 for the treatment of contaminated ground or surface waters;

(c) sand and gravel excavation operations;

(d) uncovered or uncontained storage of fertilizers;

(e) uncovered or uncontained storage of road or parking lot de-icing and sanding materials;

(f) storage or disposal of snow or ice, removed from highways and streets outside the Zone A, that contains deicing chemicals;

(g) uncovered or uncontained storage of manure;

(h) junk and salvage operations;

(i) motor vehicle repair operations;

(j) cemeteries (human and animal) and mausoleums;

(k) solid waste combustion facilities or handling facilities as defined at 310 CMR 16.00;

(l) land uses that result in the rendering impervious of more than 15%, or more than 20% with artificial recharge, or 2500 square feet of any lot, whichever is greater; and

(m) commercial outdoor washing of vehicles, commercial car washes.

(3) Department Variances.

(a) The Department may grant a variance from the requirements of 310 CMR 22.20C(1)(f) to a proponent that, despite its best efforts, is unable to adopt one or more of the requirements set forth in 310 CMR 22.20C(2) if the Department finds that strict compliance with such requirements would result in an undue hardship and would not serve to further the intent of 310 CMR 22.20A, B and C.

(b) The Department will consider the following factors in making the finding necessary to grant a variance pursuant to 310 CMR 22.20C(3):

1. the reasonableness of available alternatives to the proposed surface water source;

2. the overall effectiveness of existing land use controls and other measures on the protection of the proposed surface water source and any other water sources used by the supplier of water;

3. the nature and extent of the risk of contamination to the proposed surface water source that would result from the granting of the variance; and

4. whether the variance is necessary to accommodate an overriding community, regional, state, or national public interest.

5. These factors need not be weighed equally, nor must all of these factors be present for the Department to grant a variance. The presence of any single factor may be sufficient for the granting of a variance.

(c) A variance granted pursuant to 310 CMR 22.20C(3) shall be conditioned on such monitoring, public education or other requirements as the Department may prescribe.

(d) Requests for variances shall be made in writing and clearly state the provision or requirement from which the variance is sought and the reasons and facts that support the granting of a variance, and shall include an evaluation of the reasonableness of alternatives to the proposed surface water source.

(e) Within 14 days of filing a request for variance under 310 CMR 22.20C(3)(a), the proponent filing the request shall notify persons served by the supplier of water by direct mail and by publication on not less than three consecutive days in a newspaper of general circulation in the service area of the supplier of water. The notice shall include:

1. the provision or requirement from which the variance is being sought;

2. the identity of the proponent of the surface water source;

3. the identity of the person requesting the variance, the address where a copy of the request for variance will be available for public inspection, and the times it will be available; and

4. a statement that the Department will receive written comments concerning the request from the public for a 30 day period commencing on the last date of newspaper publication.

(f) Each proponent submitting a request for variance shall submit to the Department a copy of the public notice required by 310 CMR 22.20C(3)(e) and affidavits attesting to the fact that the notices have been given. The Department will receive written comments concerning the request from the public for a 30- day period commencing on the last date of newspaper publication.

22.20C: continued

(g) Within 30 days of the close of the comment period, each proponent requesting a variance under 310 CMR 22.20C(3)(a) shall respond in writing to all reasonable public comments received by the Department.

(h) The Department may schedule a public hearing on any request for variance submitted in accordance with 310 CMR 22.20C(3) if it determines on the basis of the public comments received that such a hearing is in the public interest. In the event that the Department schedules a hearing, the proponent filing the request shall notify persons served by the supplier of water of the hearing by publication on not less than three consecutive days in a newspaper of general circulation in the service area of the supplier of water. In addition, the proponent filing the request shall notify each person who submitted written comment concerning the request to the Department by direct mail. The proponent filing the request shall submit to the Department a copy of the public notices required by 310 CMR 22.20C(3)(h), and an affidavit attesting to the fact that the notices have been given, prior to the hearing. Proponents filing a request for a variance under 310 CMR 22.20C(3) shall pay in full the cost of any hearing scheduled.

(i) Within 30 days of the grant of a variance under 310 CMR 22.20C(3), any proponent who receives a variance shall notify persons served by the supplier of water of the granting of the variance, including any conditions imposed by the Department, by direct mail and by publication on not less than three consecutive days in a newspaper of general circulation in the service area of the supplier of water. The proponent who receives the variance shall submit to the Department a copy of the public notices and an affidavit attesting to the fact that the notices have been given upon completion of the public notification.

22.20D: Interim Enhanced Surface Water Treatment Rule

(1) General Requirements.

(a) 310 CMR 22.20D establishes requirements for filtration and disinfection that are in addition to criteria established under 310 CMR22.20A The requirements of 310 CMR 22.20D apply to all public water supplies serving at least 10,000 people, beginning January 1, 2002 unless otherwise specified. 310 CMR 22.20D establishes or extends treatment technique requirements in lieu of maximum contaminant levels for the following contaminants:

1. *Giardia lamblia*
2. Viruses
3. Heterotrophic plate count bacteria
4. *Legionella*
5. *Cryptosporidium*, and
6. Turbidity.

(b) Each supplier of water serving at least 10,000 people using a surface water source, or ground water source under the direct influence of surface water shall provide treatment of its source water that complies with the treatment technique requirements set forth in 310 CMR 22.20D in addition to the requirements identified in 310 CMR 22.20A. The treatment technique requirements set out in 310 CMR 22.20D consist of installing and properly operating water treatment processes which reliably achieve:

1. At least 99% (2-log) removal of *Cryptosporidium* between a point where water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered systems, or *Cryptosporidium* control under the watershed control plan for unfiltered systems.
2. Compliance with the profiling and benchmark requirements under the provisions of 310 CMR 22.20D(3).

(c) A public water system subject to the requirements of 310 CMR 22.20D is deemed to be in compliance with the requirements of 310 CMR 22.20D(1)(a) and (b) if:

1. It meets the requirements for avoiding filtration in 310 CMR 22.20A(2) and 310 CMR 22.20D(2) and the disinfection requirements in 310 CMR 22.20A(3) and 310 CMR 22.20D(3); or,
2. It meets the applicable filtration requirements in either 310 CMR 22.20A(4) or 310 CMR 22.20D(4) and the disinfection requirements in 310 CMR 22.20A(3) and 310 CMR 22.20D(3).

22.20D: continued

(d) A supplier of water is not permitted to construct uncovered finished water storage facilities.

(e) A supplier of water that uses a surface water source or ground water source under the direct influence of surface water that did not conduct disinfection profiling under 310 CMR 22.20D(3)(b) because they served fewer than 10,000 persons when such monitoring was required, but serve more than 10,000 persons prior to January 14, 2005 must comply with 310 CMR 22.20D(1), 310 CMR 22.20D(2), 310 CMR 22.20D(4), 310 CMR 22.20D(5), and 310 CMR 22.20D(6). These systems must also consult with the Department to establish a disinfection benchmark. A supplier of water that decides to make a significant change to its disinfection practice, as described in 310 CMR 22.20D(3)(c)1.a. through 310 CMR 22.20D(3)(c)1.e. must consult with the Department prior to making such change.

(2) Criteria for Avoiding Filtration. 310 CMR 22.20D(2) establishes criteria for avoiding filtration for a supplier of water that uses a surface water source or a ground water source under the influence of surface water to serve a population of at least 10,000 people in addition to the requirements of 310 CMR 22.20A(2). Each supplier of water shall meet all of the following conditions:

(a) Site-specific Conditions. In addition to site-specific conditions in 310 CMR 22.20A(2)(b), a supplier of water shall maintain the watershed control program under 310 CMR 22.20A(2)(b)5. to minimize the potential for contamination by *Cryptosporidium oocysts* in the source water. The watershed control program shall, for *Cryptosporidium*:

1. Identify watershed characteristics and activities which may have an adverse effect on source water quality; and,

2. Monitor the occurrence of activities that may have an adverse effect on source water quality.

(b) During the onsite inspection conducted under the provisions of 310 CMR 22.20A(2)(b)(3), the Department will determine whether the watershed control program established under 310 CMR 22.20A(2)(b)5. is adequate to limit potential contamination by *Cryptosporidium oocysts*.

(3) Disinfection Profiling and Benchmarking. 310 CMR 22.20D(3) establishes criteria that the Department will use to determine public water systems that are required to profile. A supplier of water subject to the requirements of 310 CMR 22.20D(3) had to determine its TTHM annual average using the procedure in 310 CMR 22.20D(3)(a) and its HAA5 annual average using the procedure of 310 CMR 22.20D(3)(b). The annual average is the arithmetic average of the quarterly averages of four consecutive quarters of monitoring.

(a) Determination of Systems Required to Profile.

1. The TTHM annual average is the annual average determined during the same period as was used for the HAA5 annual average:

a. A supplier of water who collected data under the provisions of the "Information Collection Rule"(ICR) was required to use the results of the samples collected during the last four quarters of required monitoring under the " disinfection byproduct and related monitoring" of the ICR.

b. A supplier of water who used "grandfathered" HAA5 occurrence data that met the provisions of 310 CMR 22.20D(3)(a) 2b shall use TTHM data collected at the same time under the provisions of 310 CMR 22.07E.

c. A supplier of water who used HAA5 occurrence data that met the provisions of 310 CMR 22.20D(3)(a)2.c.(i) was required to use TTHM data collected at the same time under the provisions of 310 CMR 22.07(2) and 310 CMR 22.07E.

2. The HAA5 annual average is the annual average during the same period as was used for the TTHM annual average with the following provisions:

a. A supplier of water who collected data under the Information Collection Rule shall have used the results of the samples collected during the last four quarters of required monitoring under the ICR.

b. A supplier of water who collected four quarters of HAA5 occurrence data that met the routine monitoring sample number and location requirements for TTHMs in 310 CMR 22.07E(1), 310 CMR 22.07E(2) and the handling and analytical method requirements of the ICR may use that data to determine whether the requirements of 310 CMR 22.20D(3) apply.100

22.20D: continued

c. A supplier of water who did not collect four quarters of HAA5 occurrence data that met the provisions of either 310 CMR 22.20D(3)(a)2.a. and 310 CMR 22.20D(3)(a)2.b. by March 31,1999 must either:

(i) have conducted monitoring for HAA5 that met the routine monitoring sample number and location requirements for TTHM in 310 CMR 22.07(2) and 310 CMR 22.07E and the handling and analytical method requirements of 310 CMR 22.07E to determine the HAA5 annual average and whether the requirements of 310 CMR 22.07C(3) apply, which monitoring shall have been completed so that the applicability determination could be made no later than March 31, 2000; or,

(ii) comply with all other provisions of 310 CMR 22.20D(3)(b)2. as if the HAA5 monitoring had been conducted and the results required compliance with 310 CMR 22.20D(3)(b).

3. The supplier of water may request the Department approve a more representative annual data set than the data set determined in 310 CMR 22.20D(3)(a)1. or 2. for the purpose of determining applicability of the requirements of 310 CMR 22.20D(3). A representative data set was to be determined based on the following:

a. Whether the method of collection was in accordance with 310 CMR22.20D(3), 310 CMR 22.07(2), 310 CMR 22.07E; and

b. Whether the annual set presented is representative of the plant's current and/or long-term disinfection practices.

4. The Department may require that a system use a more representative annual data set than the data set determined under 310 CMR 22.20D(3)(a)1. or 2. for the purpose of determining applicability of the requirements of 310 CMR 22.20D.

5. The supplier of water must have submitted data to the Department on the schedule as shown below:

a. A supplier of water who collected TTHM and HAA5 data under the provisions of Information Collection Rule (ICR), as was required by 310 CMR 22.20D(3)(a)1.a. and 310 CMR 22.20D(3)(a)2.a., must have submitted the results of the samples collected during the last 12 months of required monitoring under the ICR not later than December 31, 1999.

b. A supplier of water who collected four consecutive quarters of data that met the routine monitoring sample number and location for TTHM in 310 CMR 22.07A and 310 CMR 22.07E for handling and analytical method requirements, as was allowed by 310 CMR 22.20D(3)(a)1.b. and 310 CMR 22.20D(3)(a)2.b., must have submitted that data to the Department not later than April 16, 1999. Until the Department has approved the data, the system shall conduct monitoring for HAA5 using the monitoring requirements specified under 310 CMR 22.20D(3)(a) 2.c.

c. A supplier of water who conducted monitoring for HAA5 using the monitoring requirements specified by 310 CMR 22.20D(3)(a)1.c. and 310 CMR 22.20D(3)(a)2.c.(i), must have submitted TTHM and HAA5 data not later than March 31, 2000.

d. A supplier of water who elected to comply with all other provisions of 310 CMR 22.20D(3) as if the HAA5 monitoring had been conducted and the results required compliance with 310 CMR 22.20D(3)(a), as was allowed under 310 CMR 22.20D(3)(a)2.c.(i), must have notified the Department in writing of their election not later than March 31, 2000.

e. If the supplier of water elected to request that the Department approve a more representative annual data set than the data set determined under 310 CMR 22.20D(3)(a)2.a., the system must have submitted this request in writing not later than March 31, 2000.

6. Any supplier of water having either a TTHM annual average greater than or equal to 0.064 mg/L or an HAA5 annual average greater than or equal to 0.048 mg/L during the period identified in 310 CMR 22.20D(3)(a)1. and 2. shall comply with 310 CMR 22.20D(3)(b).

7. An owner or operator of a consecutive systems was not required to develop a disinfection profile; however, they are required to meet the requirements of 310 CMR 22.07E.

22.20D: continued

(b) Disinfection Profiling.

1. A supplier of water who meets the criteria in 310 CMR 22.20D(3)(a)6. shall develop a disinfection profile of their disinfection practice for a period of up to three years.

2. A supplier of water shall monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT 99.9 values in Tables 1.1-1.6, 2.1, and 3.1 of 310 CMR 22.20A(5)(b); and Tables C1-C13 of 310 CMR 22.20D(3), as appropriate, through the entire treatment plant. The supplier of water shall have begun this monitoring not later than April 1, 2000. As a minimum, the supplier of water using a single point of disinfectant application prior to entrance to the distribution system shall conduct monitoring in accordance with 310 CMR 22.20D(3)(b)2.a. through d. A supplier of water using a system with more than

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one point of disinfectant application shall conduct the monitoring in accordance with 310 CMR 22.20D(3)(b)2.a. through d. for each disinfection segment. The supplier of water shall monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in 310 CMR 22.20A(5), as follows:

a. The temperature of the disinfected water shall be measured once daily at each residual disinfectant concentration sampling point during peak hourly flow.

b. If the system uses chlorine, the pH of the disinfected water shall be measured once daily at each chlorine residual disinfectant concentration sampling point during peak hourly flow.

c. The disinfectant contact time(s) ("T") shall be determined for each day during peak hourly flow.

d. The residual disinfectant concentration(s) ("C") of the water before or at the first customer and prior to each additional point of disinfection shall be measured daily during peak hourly flow.

3. In lieu of the monitoring conducted under the provisions of 310 CMR 22.20D(3)(b)2 to develop the disinfection profile, the supplier of water may have elected to meet the requirements of paragraph 310 CMR 22.20D(3)(b)3.a. In addition to the monitoring conducted under the of 310 CMR 22.20D(3)(b)2 to develop the disinfection profile, the system may elect to meet the requirements of 310 CMR 22.20D(3)(b)3.b.

a. A supplier of water who has three years of existing operational data could have submitted that data, a profile generated using that data, and a request that the Department approve the use of that data in lieu of monitoring under the provisions of 310 CMR 22.20D(3)(b)2. not later than March 31, 2000. This data shall be representative of Giardia lamblia inactivation through the entire treatment plant and not just of certain treatment segments. Until the Department approves this request, the supplier of water is required to conduct monitoring under the provisions of 310 CMR 22.20D(3)(b)2.

b. In addition to the disinfection profile generated under 310 CMR 22.20D(3)(b)2., a supplier of water who has existing operational data may use that data to develop a disinfection profile for additional years. The supplier of water may use these additional yearly disinfection profiles to develop a benchmark under the provisions of 310 CMR 22.20D(3)(c). The Department will determine whether these operational data are substantially equivalent to data collected under the provisions of 310 CMR 22.20D(3)(b)2. These data shall be representative of inactivation through the entire treatment plant, and not just of certain treatment segments.

4. The supplier of water shall calculate the total inactivation ratio as follows:

a. If the supplier of water uses only one point of disinfectant application, the supplier of water may determine the total inactivation ratio for the disinfection segment based on either of the methods below:

(i) Determine one inactivation ratio CTcalc/CT 99.9 before or at the first customer during peak hourly flow; or,

(ii) Determine successive CTcalc/CT 99.9 values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the supplier of water shall calculate the total inactivation ratio by determining CTcalc/CT 99.9 for each sequence and then add the CTcalc/CT 99.9 values together:

$$\sum \frac{(CTcalc)}{(CT_{99.9})}$$

b. If the supplier of water uses more than one point of disinfectant application before the first customer, the supplier of water shall determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The supplier of water shall calculate the CTcalc/CT 99.9 value of each segment and S(CTcalc/CT 99.9) using the method in 310 CMR 22.20D(3)(b)4.a.

c. The supplier of water shall determine the total logs of inactivation (z) by multiplying the value calculated in 310 CMR 22.20D(b)4.a. or b. by 3.0 as shown below:

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$$z = 3 \times \sum \frac{(CTcalc)}{(CT_{99.9})}$$

$$Percent\ Inactivation = 100 - \frac{100}{10^{z}}$$

5. Each supplier of water who uses either chloramines or ozone for primary disinfection shall also calculate the logs of inactivation for viruses using a method approved by the Department.

6. A supplier of water who uses mixed oxidants shall calculate the overall "CT" by finding the summation of the individual "CTs" of each disinfectant within the mix.

7. Each supplier of water shall retain the disinfection profile data in graphic form, as a spreadsheet, or in some other format acceptable to the Department for review as part of sanitary surveys conducted by the Department.

(c) Disinfection Benchmarking.

1. Each supplier of water required to develop a disinfection profile under the provisions of 310 CMR 22.20D(a) and (b) who decides to make a significant change to a disinfection practice shall consult with the Department prior to making the change. A significant change to disinfection practice is any of the following:

a. A change to the point of disinfection;

b. A change to the disinfectant(s) used in the treatment plant,

c. A change to the disinfection process,

d. A physical modification(s) that directly or indirectly effects the detention time of any unit process.

e. Any other modification identified by the Department.

2. Each supplier of water who proposes to modify its disinfection practice shall calculate the disinfection benchmark using the following procedure:

a. For each year of profiling data collected and calculated under 310 CMR 22.20D(3)(b), the supplier of water shall determine the lowest average monthly *Giardia lamblia* inactivation in each year of profiling data. The supplier of water shall determine the average *Giardia lamblia* inactivation for each calendar month for each year of profiling data by dividing the sum of daily *Giardia lamblia* of inactivation by the number of values calculated for that month.

b. The disinfection benchmark is the lowest monthly average value (for systems with one year of profiling data) or average of lowest monthly average values (for systems with more than one year of profiling data) of the monthly logs of *Giardia lamblia* inactivation in each year of profiling data.

3. Each supplier of water who uses either chloramines or ozone for primary disinfection shall also calculate the disinfection benchmark for viruses using a method approved by the Department.

4. Each supplier of water shall submit the information required in 310 CMR 22.20D(3)(c) and the information required in 310 CMR 22.20D(3)(c) 4.a., b., and c. to the Department as part of the consultation process including:

a. A description of the proposed change

b. The disinfection profile for Giardia lamblia (and, if necessary, viruses) under 310 CMR 22.20D(3)(b) and benchmark as required by 310 CMR 22.20D(3)(c)2.; and,

c. An analysis of how the proposed change will affect the current levels of disinfection.

(4) Filtration. Each supplier of water using a system subject to the requirements of 310 CMR 22.20D that does not meet all of the criteria of 310 CMR 22.20D(2) and the criteria in 310 CMR 22.20A(2) for avoiding filtration shall provide treatment consisting of both disinfection, as specified in 310CMR 22.20A(3)(b), and filtration treatment that complies with the requirements of 310 CMR 22.20D(4)(a) or (b) and 310 CMR 22.20A(4)(b) or (c) by December 31, 2001.

(a) Conventional Filtration Treatment or Direct Filtration.

1. Each supplier of water using conventional filtration or direct filtration, shall maintain a turbidity level in representative samples of a system's filtered water of less than or equal to 0.3 NTU in at least 95% of the measurements taken each month, measured as specified in 310 CMR 22.20A(5)(a) and (c).

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2. Each supplier of water must maintain a turbidity level of representative samples of a system's filtered water that at no time exceed 1 NTU, measured as specified in 310 CMR 22.20A(5)(a) and (c).

3. A supplier of water who uses lime softening may acidify representative samples prior to analysis in accordance with a protocol approved by the Department.

(b) Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration.

1. A supplier of water may use a filtration technology not listed in 310 CMR 22.20D(4)(a) or in 310 CMR 22.20A(4)(b) or (c) if the supplier of water demonstrates to the Department, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of 310 CMR 22.20A(3)(b), consistently achieves 99.9% removal and/or inactivation of *Giardia lamblia* cysts and 99.99% removal and/or inactivation of viruses, and 99% removal of *Cryptosporidium* oocysts, and the Department approves the use of the filtration technology. For each approval, the supplier of water shall maintain the turbidity level of representative samples of the system's filtered water at less than or equal to 0.3 NTU at least 95% of the time and that the system shall not exceed one NTU at any time.

2. The performance standards of slow sand filters and diatomateous earth filters are the same as indicated in 310 CMR 22.20A.

(5) Monitoring Requirements for Systems Using Filtration Treatment.

(a) In addition to monitoring required by 310 CMR 22.20A(5), a supplier of water who relies upon a public water system subject to the requirements of 310 CMR 22.20D that provides conventional filtration treatment or direct filtration shall conduct continuous monitoring of turbidity for each individual filter using an approved method in 310 CMR 22.20A(5)(a), and shall calibrate turbidimeters using the procedure specified by the manufacturer. The supplier of watershall record the results of individual filter monitoring every 15 minutes.

(b) If there is a failure in the continuous turbidity monitoring equipment, the supplier of water shall conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

(6) Reporting and Recordkeeping Requirements. In addition to the reporting and recordkeeping requirements in 310 CMR 22.20A(6), a supplier of water who is subject to the requirements of 310 CMR 22.20D who provides conventional filtration treatment or direct filtration shall report monthly to the Department the information specified in 310 CMR 22.20D(6)(a) and (b) beginning January 1, 2002. In addition to the reporting and recordkeeping requirements in 310 CMR 22.20A(6), a supplier of water who is subject to the requirements of 310 CMR 22.20D that provides filtration approved under 310 CMR 22.20D(4)(b) shall report monthly to the Department the information specified in 310 CMR 22.20D(6)(a) beginning January 1, 2002. This reporting in 310 CMR 22.20D(6)(a) is in lieu of the reporting specified in 310 CMR 22.20A(6).

(a) The supplier of water shall report turbidity measurements as required by 310 CMR 22.20D(4) within ten days after the end of each month the system serves water to the public. Information that shall be reported to the Department includes:

1. The total number of filtered water turbidity measurements taken during the month.

2. The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in 310 CMR 22.20D(4)(a) or (b).

3. The date and value of any turbidity measurements taken during the month which exceed one NTU for systems using conventional filtration treatment or direct filtration, or exceed the maximum level set by the Department in 310 CMR 22.20D(4)(b).

(b) The supplier of water shall maintain the results of individual filter monitoring taken as required in 310 CMR 22.20D(5) for at least three years. Each supplier of water shall report that individual filter turbidity monitoring was conducted in accordance with 310 CMR 22.20D(5) within ten days after the end of each month the system serves water to the public. Each supplier of water shall report individual filter turbidity measurement results taken under 310 CMR 22.20D(5) within ten days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in 310 CMR 22.20D(6)(b)1. through 3. Each supplier of water who uses lime softening may apply to the

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Department for alternative exceedance levels for the levels specified in 310 CMR 22.20D(6)(b)1. through 4. if the supplier can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance. A supplier of water shall report the filter number, the turbidity measurement, and the date(s) on which an exceedance occurred for any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart. In addition, the supplier of water shall either produce a filter profile for the filter within seven days of the exceedance (if the supplier is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.

1. For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the supplier of water shall report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the supplier of water shall either produce a filter profile for the filter within seven days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.
2. For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the supplier of water shall report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the supplier of water shall conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self-assessment shall consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.
3. For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the supplier of water shall report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the supplier of water shall arrange for the Department to conduct a Comprehensive Performance Evaluation no later than 30 days following the exceedance and have the evaluation completed no later than 90 days following the exceedance.

(c) Additional Reporting Requirements:

1. If at any at time the turbidity exceeds one NTU in representative samples of filtered water in a system using conventional treatment or direct filtration, the supplier of water shall inform the Department as soon as possible, but not later than the end of the next business day.
2. If at any at time the turbidity exceeds one NTU in representative samples of filtered water in a system using filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration, the supplier of water shall inform the Department as soon as possible, but not later than the end of the next business day.

22.20E: Filter Backwash Recycling Rule

(1) Applicability. Each supplier of water using a surface water source or ground water source under direct influence of surface water that employs conventional filtration, direct filtration, softening, or contact clarification treatment and that recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes shall meet the requirements in 310 CMR 22.20E(2) through 310 CMR 22.20E(4).

22.20E: continued

(2) Reporting. Each supplier of water using a surface water source or ground water source under direct influence of surface water that employs conventional filtration, direct filtration, softening, or contact clarification treatment shall notify the Department in writing by December 8, 2003, if the system recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes. This notification shall include, at a minimum, the information specified in 310 CMR 22.20E(2)(a) and 310 CMR 22.20E(2)(b).

(a) A plant schematic showing the origin of all flows that are recycled (including, but not limited to, spent filter backwash water, thickener supernatant, and liquids from dewatering processes), the hydraulic conveyance used to transport them, and the location where they are re-introduced back into the treatment plant.

(b) Typical recycle flow in gallons per minute (gpm), the highest observed plant flow experienced in the previous year (gpm), design flow for the treatment plant (gpm), and Department-approved operating capacity for the plant where the Department has made such determinations.

(3) Treatment Technique Requirement. Each supplier of water using a surface water source or ground water source under direct influence of surface water that employs conventional filtration, direct filtration, softening, or contact clarification treatment that recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes must return these flows through the processes of a system's existing conventional filtration, direct filtration, softening, or contact clarification system or at an alternate location approved by the Department by June 8, 2004. If capital improvements are required to modify the recycle location to meet this requirement, all capital improvements shall be completed no later than June 8, 2006.

(4) Recordkeeping. The system shall collect and retain on file recycle flow information specified in 310 CMR 22.20E(4)(a) through 310 CMR 22.20E(4)(f) for review and evaluation by the Department beginning June 8, 2004:

(a) Copy of the recycle notification and information submitted to the Department under 310 CMR 22.20E(2),

(b) List of all recycle flows and the frequency with which they are returned,

(c) Average and maximum backwash flow rate through the filters and the average and maximum duration of the filter backwash process in minutes,

(d) Typical filter run length and a written summary of how filter run length is determined,

(e) The type of treatment provided for the recycle flow, and

(f) Data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used and average dose and frequency of use, and frequency at which solids are removed, if applicable.

22.20F: Long Term 1 Enhanced Surface Water Treatment Rule

(1) General Requirements.

(a) 310 CMR 22.20F establishes requirements for filtration and disinfection that are in addition to criteria under 310 CMR 22.20A. The requirements of 310 CMR 22.20F apply to public water systems serving fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water, beginning January 1, 2005 unless otherwise specified. 310 CMR 22.20F establishes or extends treatment technique requirements in lieu of maximum contaminant levels for the following contaminants:

1. Giardia lamblia
2. Viruses
3. Heterotrophic plate count bacteria
4. Legionella
5. Cryptosporidium, and
6. Turbidity.

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(b) Each supplier of water serving fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water shall provide treatment of its source water that complies with the treatment technique requirements set forth in 310 CMR 22.20F in addition to the requirements identified in 310 CMR 22.20A. The treatment technique requirements set out in 310 CMR 22.20F consist of installing and properly operating water treatment processes that reliably achieve:

1. At least 99% (2-log) removal of *Cryptosporidium* between a point where water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered systems, or *Cryptosporidium* control under the watershed control plan for unfiltered systems.
2. Compliance with the profiling and benchmark requirements in 310 CMR 22.20F(4)(a) through 310 CMR 22.20F(5)(e).

(c) A public water system subject to the requirements of 310 CMR 22.20F shall also meet the following requirements:

1. It shall cover any finished water reservoir that started construction on or after March 15, 2002 as described in 310 CMR 22.20F(2)(a) and 310 CMR 22.20F(2)(b).
2. If it is an unfiltered system, it shall comply with the updated watershed control requirements described in 310 CMR 22.20F(3)(a) through 310 CMR 22.20F(3)(c).
3. If it is a community or non-transient non-community water systems, it shall develop a disinfection profile as described in 310 CMR 22.20F(4)(a) through 310 CMR 22.20F(4)(g).
4. If it is considering making a significant change to its disinfection practices, it shall develop a disinfection benchmark and consult with the Department for approval of the change as described in 310 CMR 22.20F(5)(a) through 310 CMR 22.20F(5)(e).
5. If it is a filtered system, it shall comply with the combined filter effluent requirements as described in 310 CMR 22.20F(6)(a) through 310 CMR 22.20F(6)(d).
6. If it is a filtered system that uses conventional or direct filtration, it shall comply with the individual filter turbidity requirements as described in 310 CMR 22.20F(7)(a) through 310 CMR 22.20F(7)(e).
7. It shall comply with the applicable reporting and record keeping requirements as described in 310 CMR 22.20F(8)(a) and 310 CMR 22.20F(8)(b).

(2) Finished Water Reservoirs.

(a) Each supplier of water serving fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water is subject to 310 CMR 22.20F(2)(b).

(b) If the supplier of water begins construction of a finished water reservoir on or after March 15, 2002 the reservoir shall be covered. Finished water reservoirs for which the supplier of water began construction prior to March 15, 2002 are not subject to 310 CMR 22.20F(2), but are subject to 310 CMR 22.20A.

(3) Additional Watershed Control Requirements for Unfiltered Systems.

(a) Each supplier of water serving fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water which does not provide filtration shall continue to comply with all of the filtration avoidance criteria in 310 CMR 22.20A(2), as well as the additional watershed control requirements in 310 CMR 22.20F(3)(b).

(b) The supplier of water must take any additional steps necessary to minimize the potential for contamination by *Cryptosporidium* oocysts in the source water. The supplier of water's watershed control program shall, for *Cryptosporidium*:

1. Identify watershed characteristics and activities which may have an adverse effect on source water quality; and
2. Monitor the occurrence of activities, which may have an adverse effect on source water quality.

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(c) During an onsite inspection conducted under the provisions of 310 CMR 22.20A(2)(b)5., the Department will determine whether the watershed control program is adequate to limit potential contamination by *Cryptosporidium* oocysts. The adequacy of the program will be based on the comprehensiveness of the watershed review; the effectiveness of the program to monitor and control detrimental activities occurring in the watershed; and the extent to which the supplier of water has maximized land ownership and/or controlled land use within the watershed.

(4) Disinfection Profiling.

(a) Each supplier of water, community or non-transient non-community water system, serving fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water shall develop a disinfection profile unless the Department determines that the system's profile is unnecessary. The Department may approve the use of a more representative data set for disinfection profiling than the data set required in 310 CMR 22.20F(4)(c) through 310 CMR 22.20F(4)(g).

(b) The Department may only determine that a system's profile is unnecessary if a system's TTHM and HAA5 levels are below 0.064 mg/L and 0.048 mg/L, respectively. To determine these levels, TTHM and HAA5 samples must be collected after January 1, 1998, during the month with the warmest water temperature, and at the point of maximum residence time in the distribution system.

(c) A disinfection profile shall be developed using the following three steps:

1. The supplier of water shall collect data for several parameters from the plant as required in 310 CMR 22.20F(4)(d) over the course of 12 months. If the system serves between 500 and 9,999 persons the supplier of water must begin to collect data no later than July 1, 2003. If the system serves fewer than 500 persons the supplier of water must begin to collect data no later than January 1, 2004;
2. The supplier of water shall use the data to calculate weekly log inactivation as required in 310 CMR 22.20F(4)(e) and 310 CMR 22.20F(4)(f); and
3. The supplier of water shall use these weekly log inactivations to develop a disinfection profile as specified in 310 CMR 22.20F(4)(g).

(d) The supplier of water shall monitor the following parameters to determine the total log inactivation using the analytical methods in 310 CMR 22.20A(5)(a), once per week on the same calendar day, over 12 consecutive months:

1. The temperature of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;
2. If the system uses chlorine, the pH of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;
3. The disinfectant contact time(s) ("T") during peak hourly flow; and
4. The residual disinfectant concentration(s) ("C") of the water before or at the first customer and prior to each additional point of disinfection during peak hourly flow.

(e) The supplier of water shall calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine the log inactivation of *Giardia lamblia*:

1. If the supplier of water uses only one point of disinfectant application, the supplier of water shall determine the total inactivation ratio for the disinfection segment based on either of the following methods:
   a. Determine one inactivation ratio ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow; or
   b. Determine successive $CTcalc/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system must calculate the total inactivation ratio by determining ($CTcalc/CT_{99.9}$) for each sequence and then add the ($CTcalc/CT_{99.9}$) values together to determine ($3CTcalc/CT_{99.9}$).
2. If the supplier of water uses more than one point of disinfectant application before the first customer, the supplier of water shall determine the ($CTcalc/CT_{99.9}$) value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow using the procedure specified in 310 CMR 22.20F(4)(e)1.b.

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(f) If the supplier of water uses chloramines, ozone, or chlorine dioxide for primary disinfection, the supplier of water shall also calculate the logs of inactivation for viruses and develop an additional disinfection profile for viruses using methods approved by the Department.

(g) Each supplier of water will use each log inactivation as a data point in the disinfection profile. The supplier of water will have obtained 52 measurements (one for every week of the year). This will allow the supplier of water and the Department the opportunity to evaluate how microbial inactivation varied over the course of the year by looking at all 52 measurements (the Disinfection Profile). The supplier of water shall retain the Disinfection Profile data in graphic form, such as a spreadsheet, which must be available for review by the Department as part of a sanitary survey. The supplier of water shall use this data to calculate a benchmark if they are considering changes to disinfection practices.

(5) Disinfection Benchmark.

(a) A supplier of water serving fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water required to develop a disinfection profile under 310 CMR 22.20F(4), shall develop a Disinfection Benchmark if the supplier of water decides to make a significant change to the disinfection practice. The supplier of water shall consult with the Department for approval before implementing a significant disinfection practice change.

(b) Significant changes to disinfection practice include:

1. Changes to the point of disinfection;
2. Changes to the disinfectant(s) used in the treatment plant;
3. Changes to the disinfection process; or
4. Any other modification identified by the Department.

(c) If the supplier of water is considering a significant change to its disinfection practice, the supplier of water shall calculate a disinfection benchmark(s) as described in 310 CMR 22.20F(5)(d) and 310 CMR 22.20F(5)(e) and provide the benchmark(s) to the Department. The supplier of water may only make a significant disinfection practice change after consulting with and obtaining the approval of the Department. The system shall submit the following information to the Department as part of the consultation and approval process:

1. A description of the proposed change,
2. The disinfection profile for *Giardia lamblia* (and, if necessary, viruses) and disinfection benchmark,
3. An analysis of how the proposed change will affect the current levels of disinfection, and
4. Any additional information requested by the Department.

(d) If the supplier of water is making a significant change to its disinfection practice, the supplier of water shall calculate a disinfection benchmark using the following procedure:

1. Using the data the supplier of water collected to develop the Disinfection Profile, determine the average *Giardia lamblia* inactivation for each calendar month by dividing the sum of all *Giardia lamblia* inactivations for that month by the number of values calculated for that month.
2. Determine the lowest monthly average value out of the twelve values. This value becomes the disinfection benchmark.

(e) If the supplier of water uses chloramines, ozone or chlorine dioxide for primary disinfection, the supplier of water shall calculate the disinfection benchmark from the data the system collected for viruses to develop the disinfection profile in addition to the *Giardia lamblia* disinfection benchmark calculated under 310 CMR 22.20F(5)(d). This viral benchmark shall be calculated in the same manner used to calculate the *Giardia lamblia* disinfection benchmark in 310 CMR 22.20F(5)(d).

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(6) Combined Filter Effluent Requirements.

(a) Each supplier of water that serves fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water is required to filter, and each supplier of water that utilizes filtration other than slow sand filtration or diatomaceous earth filtration shall meet the combined filter effluent (CFE) turbidity requirements of 310 CMR 22.20F(6)(b) through 310 CMR 22.20F(6)(d). If the supplier of water uses slow sand or diatomaceous earth filtration the supplier of water is not required to meet the CFE turbidity limits of 310 CMR 22.20F, but such supplier of water shall continue to meet the CFE turbidity limits in 310 CMR 22.20A(4).

(b) Each supplier of water that serves fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water is required to filter, and each supplier of water that utilizes filtration other than slow sand filtration or diatomaceous earth filtration shall meet two strengthened CFE turbidity limits as follows:

1. The first CFE turbidity limit is a "95th percentile" turbidity limit that the system shall meet in at least 95% of the turbidity measurements taken each month. Measurements must continue to be taken as described in 310 CMR 22.20A(5)(b)1. and 310 CMR 22.20A(5)(b)3. Monthly reporting shall be completed according to 310 CMR 22.20F(8).

   a. If the supplier of water uses conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 0.3 NTU in at least 95% of the measurements taken each month, measured as specified in 310 CMR 22.20A(5)(a) and 310 CMR 22.20A(5) (c).

   b. If the supplier of water uses "alternative" filtration the turbidity level of representative samples of the system's filtered water shall be less than or equal to 0.3 NTU in at least 95% of the measurements taken each month, measured as specified in 310 CMR 22.20A(5)(a) and 310 CMR 22.20A(5)(c).

2. The second CFE turbidity limit is a "maximum" turbidity limit that the system may not exceed at any time during the month. Measurements shall continue to be taken as described in 310 CMR 22.20A(5)(b)1. and 3. Monthly reporting shall be completed according to 310 CMR 22.20F(8)(a). The following is a description of the required limits for specific filtration technologies:

   a. If the supplier of water uses conventional filtration or direct filtration, the "maximum" turbidity level is 1 NTU.

   b. If the supplier of water uses "alternative" filtration the "maximum" turbidity level is 1 NTU.

(c) Each supplier of water that serves fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water that uses a system that consists of alternative filtration (filtration other than slow sand filtration, diatomaceous earth filtration, conventional filtration, or direct filtration) is required to conduct a demonstration. The supplier of water shall demonstrate to the Department, using pilot plant studies or other means, that the system's filtration, in combination with disinfection treatment, consistently achieves:

1. 99% removal of *Cryptosporidium* oocysts;
2. 99.9% removal and/or inactivation of *Giardia lamblia* cysts; and
3. 99.99% removal and/or inactivation of viruses.

(d) Each supplier of water serving fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water that practices lime softening, may acidify representative CFE turbidity samples prior to analysis using a protocol approved by the Department.

(7) Individual Filter Turbidity Requirements.

(a) Each supplier of water serving fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water that utilizes conventional filtration or direct filtration, shall conduct continuous monitoring of turbidity for each individual filter at the filtration facility. The following requirements apply to continuous turbidity monitoring:

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1. Monitoring must be conducted using an approved method in 310 CMR 22.20A(5)(a);
2. Calibration of turbidimeters shall be conducted using procedures specified by the manufacturer;
3. Results of turbidity monitoring shall be recorded at least every 15 minutes;
4. Monthly reporting must be completed according to 310 CMR 22.20F(8)(a); and,
5. Records shall be maintained according to 310 CMR 22.20F(8)(b).

(b) If there is a failure in the continuous turbidity monitoring equipment, the supplier of water shall conduct grab sampling every four hours in lieu of continuous monitoring until the turbidimeter is back on-line. The system has 14 days to resume continuous monitoring before a violation is incurred.

(c) If the system only consists of one or two, the supplier of water may conduct continuous monitoring of the CFE turbidity in lieu of individual filter effluent turbidity monitoring. Continuous monitoring shall meet the same requirements set forth in 310 CMR 22.20F(7)(a)1. through 310 CMR 22.20F(7)(a)4. and 310 CMR 22.20F(7)(b).

(d) If the supplier of water conducts continuous turbidity monitoring, follow-up action is required as follows:

1. If the turbidity of an individual filter or the turbidity of the CFE for systems with two filters that monitor CFE in lieu of individual filters exceeds 1.0 NTU in two consecutive recordings 15 minutes apart, the supplier of water shall report to the Department by the 10th day of the following month and include the filter number(s), corresponding date(s), turbidity value(s) which exceeded 1.0 NTU, and the cause (if known) for the exceedance(s).
2. If the supplier of water was required to report to the Department for three months in a row and turbidity exceeded 1.0 NTU in two consecutive recordings 15 minutes apart at the same filter or CFE for systems with two filters that monitor CFE in lieu of individual filters, the supplier of water shall conduct a self-assessment of the filter(s) within 14 days of the day the filter exceeded 1.0 NTU in two consecutive measurements for the third straight month unless a Comprehensive Performance Evaluation (CPE) as specified in 310 CMR 22.20F(7)(d)3. was required. Systems with two filters that monitor CFE in lieu of individual filters shall conduct a self-assessment on both filters. The self-assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report. If a self-assessment is required, the date that it was triggered and the date that it was completed shall be included.
3. If the supplier of water was required to report to the Department for two months in a row and turbidity exceeded 2.0 NTU in two consecutive recordings 15 minutes apart at the same filter or CFE for systems with two filters that monitor CFE in lieu of individual filters, the supplier of water shall arrange to have a CPE conducted by the Department no later than 60 days following the day the filter exceeded 2.0 NTU in two consecutive measurements for the second straight month. If a CPE has been completed by the Department within the 12 prior months or the supplier of water and the Department are jointly participating in an ongoing Comprehensive Technical Assistance (CTA) project at the system, a new CPE is not required. If conducted, a CPE must be completed and submitted to the Department no later than 120 days following the day the filter exceeded 2.0 NTU in two consecutive measurements for the second straight month.

(e) If the supplier of water practices lime softening, the supplier of water may apply to the Department for alternative turbidity exceedance levels for the levels specified in 310 CMR 22.20F(7)(d). The supplier of water shall be able to demonstrate to the Department that higher turbidity levels are due to lime carryover only, and not due to degraded filter performance.

(8) Reporting and Recordkeeping.

(a) In addition to the reporting and recordkeeping requirements in 310 CMR 22.20A, each supplier of water who is subject to the requirements of 310 CMR 22.20F shall report the following information to the Department at the frequency specified, if the supplier of water is subject to the specific requirement.

22.20F: continued

1. Combined filter requirements that shall be reported within ten days after the end of each month shall include:
   a. The total number of filtered water turbidity measurements taken during the month.
   b. The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in 310 CMR 22.20F(7).
   c. The date and value of any turbidity measurements taken during the month which exceed 1.0 NTU for systems using conventional filtration treatment or direct filtration, or exceed the maximum level set by the Department 310 CMR 22.20F(7).
2. The individual turbidity requirements that shall be reported within ten days after the end of each month, except as otherwise provided in 310 CMR 22.20F(8)2.c. and 310 CMR 22.20F(8)2.e., shall include:
   a. That the supplier of water conducted individual filter turbidity monitoring during the month.
   b. The filter number(s), corresponding date(s), and turbidity value(s) that exceeded 1.0 NTU during the month, but only in if two consecutive measurements exceeded 1.0 NTU.

   c. If a self-assessment is required, the date that it was triggered and the date that it was completed. If the self-assessment was triggered during the last four days of the month, the date that it was triggered and the date that it was completed shall be reported within 14 days after the date the self-assessment was triggered.
   d. If a CPE is required and the date that it was triggered.
   e. Copy of completed CPE report within 120 days after the CPE was triggered.
3. Disinfection Profiling shall include:
   a. Results of optional monitoring that show TTHM levels <0.064 mg/l and HAA5 levels <0.048 mg/l (only if the system wishes to forgo profiling) or that the system has begun disinfection profiling.
      i. For systems serving 500–9,999 by July 1, 2003
      ii. For systems serving fewer than 500 by January 1, 2004.
4. Disinfection Benchmarking shall include: A description of the proposed change in disinfection, the system's disinfection profile for *Giardia lamblia* (and, if necessary, viruses) and disinfection benchmark, and an analysis of how the proposed change will affect the current levels of disinfection anytime a significant change in disinfection practices is being considered.

(b) Each supplier of water who is subject to the requirements of 310 CMR 22.20F shall, in addition to recordkeeping requirements under 310 CMR 22.20A(6), maintain records in accordance with 310 CMR 22.17(12).

22.21: Groundwater Supply Protection

The following requirements shall apply to all persons to protect groundwater used as sources of public drinking water supply from contamination:

(1) Source Approval

(a) No public water supply well, wellfield, or spring shall be constructed, expanded or replaced, and no water supply well, wellfield , or spring shall be placed on-line in a public water system, without the prior written approval of the Department. Persons seeking such approval are directed to follow the procedures set forth in the Drinking Water Program's "Guidelines and Policies for Public Water Systems," as amended.

NON-TEXT PAGE

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All requests for source approval, or approval of Zone II and III delineations, shall be submitted to the Department's Regional Office serving the area where the proposed well, wellfield, or spring is located.

In determining whether to grant such approval, the Department shall apply the criteria set forth in 310 CMR 22.21 and the "Guidelines and Policies for Public Water Systems." Copies of the "Guidelines and Policies for Public Water Systems" are available for a nominal fee from the State Book Store, State House, Room 116, Boston, Massachusetts and 436 Dwight Street, Springfield, Massachusetts.

(b) No public water supply well or wellfield designed to withdraw, or spring which flows, less than 100,000 gallons per day shall be constructed, expanded or replaced, or placed on-line, unless the Department finds in writing:

1. that the proponent has satisfactorily complied with the Drinking Water Program's "Guidelines and Policies for Public Water Systems," as amended;
2. that the source of water supply for the well, wellfield, or spring will achieve all applicable water quality standards set forth in the Massachusetts Drinking Water Regulations, 310 CMR 22.00;
3. that the proponent has properly determined the Zone I of the proposed well, wellfield, or spring;
4. that the Zone I of the proposed well, wellfield, or spring is owned or controlled by the supplier of water; and
5. that current and/or future land uses within the Zone I are limited to those directly related to the provision of public drinking water or will have no significant adverse impact on water quality.

In addition, the Department may require the proponent to delineate Zones II and III, and submit a groundwater monitoring well program plan for approval if the Department finds that existing or proposed land uses within the Interim Wellhead Protection Area of the proposed well, wellfield, or spring, determined in accordance with 310 CMR 22.21(1)(i), may pose a threat to water quality.

(c) No public water supply well, wellfield or spring designed to withdraw, or spring which flows, 100,000 gallons per day or more shall be constructed, expanded or replaced unless the Department finds in writing:

1. that the proponent has met all the requirements set forth in 310 CMR 22.21(1)(b)1. through 310 CMR 22.21(1)(b)5.;
2. that the proponent has properly delineated the Zones II and III of the proposed well, wellfield, or spring;
3. that the proponent has submitted a groundwater monitoring well program plan designed to evaluate the water quality impacts of land uses within the Zone II of the proposed well, wellfield, or spring; and
4. that the proponent has drafted wellhead protection zoning or nonzoning controls that prohibit siting within the Zone II the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) unless designed in accordance with the performance standards specified therein, and has complied with the nitrate management requirement of 310 CMR 22.21(2)(d).

(d) No public water supply well, wellfield or spring designed to withdraw, or spring which flows, 100,000 gallons per day or more shall be placed on-line unless:

1. a groundwater monitoring well program plan approved by the Department has been fully implemented (*i.e.* the monitoring wells are operational and the sampling frequency and parameters have been approved by the Department); and
2. the cities and towns in which any part of the Zone II of the proposed well, wellfield, or spring is located have wellhead protection zoning or nonzoning controls in effect that prohibit siting within the Zone II the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) unless designed in accordance with the performance standards specified therein. If the public water system is owned or controlled by an entity other than a municipality, the proponent must demonstrate to the Department's satisfaction that it has used its best efforts to have all cities and towns in which the Zone II is located establish such zoning or nonzoning controls.

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(e) Notwithstanding 310 CMR 22.21(1)(d)(2), no public water supply well, wellfield or spring designed to withdraw, or spring which flows, 100,000 gallons per day or more that will be used in a public water system owned or operated by a municipality, and is located within that municipality, shall be placed on-line unless the municipality has wellhead protection zoning or nonzoning controls in effect that prohibit siting within the Zone II the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) unless designed in accordance with the performance standards specified therein. If the Zone II of a municipal public water system extends into another municipality, the water supplier must also demonstrate to the Department's satisfaction that it has used its best efforts to have all cities and towns into which the Zone II extends establish such zoning or nonzoning controls within the Zone II.

(f) Notwithstanding any other regulatory provision to the contrary, the Department may waive the requirement that the proponent of a public water supply well, wellfield, or spring delineate the Zone II, provided:

1. the proponent has properly delineated the Zone III;
2. each city and town in which the Zone III of the proposed well, wellfield, or spring is located has wellhead protection zoning or nonzoning controls in effect that prohibit within the Zone III the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) unless designed in accordance with the performance standards specified therein;
3. the proponent has submitted a groundwater monitoring well program plan designed to evaluate the water quality impacts of land uses within the Zone III of the proposed well, wellfield, or spring; and
4. the desired relief can be granted without substantial detriment to the public good.

In the event the Department waives the requirement that the proponent delineate the Zone II of a proposed public water supply well, wellfield, or spring, the supplier of water shall fully implement the groundwater monitoring well program plan approved by the Department before placing the well, wellfield, or spring on-line (*i.e.* the monitoring wells shall be operational and the sampling frequencies and parameters shall have been approved by the Department).

(g) In determining whether a proponent has properly determined the Zone I or delineated the Zones II or III of a well, wellfield, or spring, or adequately designed a groundwater monitoring well program plan, the Department shall apply the criteria set forth in the Drinking Water Program's "Guidelines and Policies for Public Water Systems", as amended.

(h) Any person who receives Department approval for a public water supply well, wellfield or spring designed to withdraw, or spring which flows, 100,000 gallons per day or more that is not a replacement withdrawal point shall obtain a permit for any withdrawal, in accordance with the Water Management Act, M.G.L. c. 21G, and 310 CMR 36.00.

(i) If the Department has not approved the Zone II for a public water supply well, wellfield, or spring, the Department will utilize the Interim Wellhead Protection Area as defined in 310 CMR 22.02.

(j) The proponent may meet the requirements set forth in 310 CMR 22.21(1)(d)2. by demonstrating that existing rights in perpetuity or for a specific period of years stated in the form of a restriction, easement, covenant or condition in a deed or other instrument prohibit the siting of the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) within the Zone II.

(k) The proponent may meet the requirements set forth in 310 CMR 22.21(1)(f)2. by demonstrating that existing rights in perpetuity or for a specific period of years stated in the form of a restriction, easement, covenant or condition in a deed or other instrument prohibit the siting of the land uses set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) within the Zone III.

(l) No public water supply well, wellfield or spring designed to withdraw, or spring which flows, 100,000 gallons per day or more approved after the effective date of 310 CMR 22.21 shall remain on-line following the amendment or repeal of a wellhead protection zoning or nonzoning control pertinent to that well, wellfield, or spring, or the expiration of any such period of years stated in a deed or other instrument approved pursuant to 310 CMR 22.21(1)(j) or 310 CMR 22.21(1)(k), unless the Department finds in writing that the supplier of water meets the requirements set forth in 310 CMR 22.21(1)(d) or 310 CMR 22.21(1)(e), whichever is applicable, or grants a variance in accordance with 310 CMR 22.21(5). Any

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source of supply removed from service shall be maintained by the supplier of water as an emergency source of water supply unless the Department finds in writing that the source is not needed by the supplier of water for present or future water supply.

(m) Notwithstanding any other regulatory provision to the contrary, the Department may exempt a supplier of water from any of the requirements set forth in 310 CMR 22.21(1)(d) while a state of water emergency declared pursuant to M.G.L. c. 21G, § 15, is in effect. In the event that the Department grants such an exemption, the well, wellfield, or spring shall remain on-line only for the duration of the state of water emergency, as determined by the Department.

(2) Wellhead Protection Zoning and Nonzoning Controls

(a) Wellhead protection zoning and nonzoning controls submitted to the Department in accordance with 310 CMR 22.21(1), shall collectively prohibit the siting of the following land uses within the Zone II, or Zone III if the criteria of 310 CMR 22.21(1)(f) have been met, of the proposed well, wellfield, or spring, whichever is applicable:

1. landfills and open dumps, as defined in 310 CMR 19.006;
2. landfills receiving only wastewater residuals and/or septage (wastewater residuals "monofills") approved by the Department pursuant to M.G.L. c. 21, § 26 through 53; M.G.L. c. 111, § 17; M.G.L. c. 83, §§ 6 and 7, and any regulations promulgated thereunder.
3. automobile graveyards and junkyard, as defined in M.G.L. c. 140B, § 1;
4. stockpiling and disposal of snow or ice removed from highways and streets located outside of Zone II that contains sodium chloride, chemically treated abrasives or other chemicals used for snow and ice removal;
5. petroleum, fuel oil and heating oil bulk stations and terminals, including, but not limited to, those listed under Standard Industrial Classification (SIC) Codes 5171 (not including liquified petroleum gas) and 5983. SIC Codes are established by the U.S. Office of Management and Budget and may be determined by referring to the publication, Standard Industrial Classification Manual and any subsequent amendments thereto;
6. treatment or disposal works subject to 314 CMR 5.00 for wastewater other than sanitary sewage. This prohibition includes, but is not limited to, treatment or disposal works related to activities under the Standard Industrial Classification (SIC) Codes set forth in 310 CMR 15.004(6) (Title 5), except the following:
   a. the replacement or repair of an existing system(s) that will not result in a design capacity greater than the design capacity of the existing system(s); and
   b. treatment works approved by the Department designed for the treatment of contaminated ground or surface waters and operated in compliance with 314 CMR 5.05(3) or 5.05 (13); and
   c. publicly owned treatment works, or POTWs.
7. facilities that generate, treat, store or dispose of hazardous waste that are subject to M.G.L. c. 21C and 310 CMR 30.000, except for the following:
   a. very small quantity generators, as defined by 310 CMR 30.00;
   b. household hazardous waste collection centers or events operated pursuant to 310 CMR 30.390;
   c. waste oil retention facilities required by M.G.L. c. 21, § 52A; and
   d. treatment works approved by the Department designed in accordance with 314 CMR 5.00 for the treatment of contaminated ground or surface waters.
8. any floor drainage systems in existing facilities, in industrial or commercial hazardous material and/or hazardous waste process areas or storage areas, which discharge to the ground without a DEP permit or authorization. Any existing facility with such a drainage system shall be required to either seal the floor drain (in accordance with the state plumbing code, 248 CMR 2.00), connect the drain to a municipal sewer system (with all appropriate permits and pre-treatment), or connect the drain to a holding tank meeting the requirements of all appropriate DEP regulations and policies.

(b) Wellhead protection zoning and nonzoning controls submitted to the Department in accordance with 310 CMR 22.21(1), shall collectively prohibit the siting of the following

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land uses within the Zone II, or Zone III if the criteria of 310 CMR 22.21(1)(f) have been met, of the proposed well, wellfield, or spring, whichever is applicable, unless designed in accordance with the performance standards specified below in 310 CMR 22.21(2)(b)1. through 7.:

1. storage of sludge and septage, as defined in 310 CMR 32.05, unless such storage is in compliance with 310 CMR 32.30 and 310 CMR 32.31;
2. storage of sodium chloride, chemically treated abrasives or other chemicals used for the removal of ice and snow on roads, unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate;
3. storage of commercial fertilizers, as defined in M.G.L. c. 128, § 64, unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate;
4. storage of animal manures, unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff and leachate;
5. storage of liquid hazardous materials, as defined in M.G.L. c. 21E, and/or liquid petroleum products unless such storage is:
    a. above ground level, and
    b. on an impervious surface, and
    c. either
        (i) in container(s) or above-ground tank(s) within a building, or
        (ii) outdoors in covered container(s) or above-ground tank(s) in an area that has a containment system designed and operated to hold either 10% of the total possible storage capacity of all containers, or 110% of the largest container's storage capacity, whichever is greater;

    however, these storage requirements shall not apply to the replacement of existing tanks or systems for the keeping, dispensing or storing of gasoline provided the replacement is performed in a manner consistent with state and local requirements;
6. the removal of soil, loam, sand, gravel or any other mineral substances within four feet of the historical high groundwater table elevation (as determined from monitoring wells and historical water table fluctuation data compiled by the United States Geological Survey), unless the substances removed are redeposited within 45 days of removal on site to achieve a final grading greater than four feet above the historical high water mark, and except for excavations for the construction of building foundations or the installation of utility works, or wetland restoration work conducted in accordance with a valid Order of Condition issued pursuant to M.G.L. c. 131, § 40;
7. and land uses that result in the rendering impervious of more than 15% or 2500 square feet of any lot or parcel, whichever is greater, unless a system for artificial recharge of precipitation is provided that will not result in the degradation of groundwater quality.

(c) The proponent shall give written notice to the Department of any and all local by-laws, ordinances, rules and regulations that allow for the grant of a variance, waiver or exemption from any of the wellhead protection zoning or nonzoning controls submitted to the Department for approval in accordance with 310 CMR 22.21 before placing the proposed well, wellfield, or spring on-line.

(d) The Department may require as part of the Source Approval process requirements of 310 CMR 22.21(1) (c), the completion of a nitrogen loading analysis for the new well, wellfield, or spring's Zone II. A nitrogen loading analysis shall be required when, in the Department's judgement, the type and level of land use within the Zone II or other information reasonably indicates that nitrate concentrations in the well, wellfield, or spring may or will exceed five mg/l nitrate.

Public water systems required by their Water Management Act permits issued under 310 CMR 36.00 to define Zone IIs and implement land use controls shall be required to conduct a nitrate loading analysis as part of the Zone II delineation for well, wellfield, or springs that have exceeded five mg/l nitrate.

Public water systems whose required nitrate loading analysis predicts >five mg/l nitrate or whose well, wellfield, or spring has exceeded five mg/l nitrate must prepare a nitrate management plan, subject to the Department's approval, which seeks to maintain nitrate levels below five mg/l for the subject well in the long-term.

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(3) Requirements for all New and Existing Groundwater Sources

(a) Sources for Community Systems. Any person who obtains Department approval for a community public water system that relies entirely upon groundwater sources shall provide additional wells, wellfield, or springs and pumping equipment, or the equivalent, capable of producing the same volumes and quality of water as the system's primary well, wellfield, or spring at all times, or shall provide the storage capacity equivalent to the demand of at least two average days if approved by the Department, unless an interconnection with another public water system has been provided which can adequately provide the quantity and quality of water needed.

(b) Zone I. All suppliers of water shall acquire ownership or control of sufficient land around wells, infiltration galleries, springs and similar sources of ground water used as sources for drinking water to protect the water from contamination. This requirement shall generally be deemed to have been met if all land within Zone I is under the ownership or control of the supplier of water. Current and future land uses within the Zone I shall be limited to those land uses directly related to the provision of the public water system or to other land uses which the public water system has demonstrated have no significant impact on water quality. The Department may require greater distances or permit lesser distances than the Zone I distances set forth at 310 CMR 22.02, if the Department deems such action necessary or sufficient to protect public health. No new underground storage tanks for petroleum products shall be located within Zone I

(4) Inspection and Enforcement

(a) Each supplier of water shall annually survey the land uses within Zones I, II and III, or within the Interim Wellhead Protection Area, for each well and wellfield under its control.

(b) A supplier of water shall submit to the Department an annual report that identifies for each well and wellfield under its ownership and control the presence of new land uses within the Zones I, II and III, or within the Interim Wellhead Protection Area, that could adversely impact water quality. The annual reports shall be submitted on Department approved forms by January 31 for the preceding calendar year. The annual reports shall be submitted to the Department's Office of Water Supply at the Regional Office that serves the area where the well, wellfield, or spring is located.

(c) A supplier of water shall notify the local board of health or health department within 48 hours of detection of any violation of a statutory or regulatory requirement that may adversely effect its water supply or distribution system, and shall notify the inspector of buildings, building commissioners or local inspector, or the person charged with enforcement of local zoning and nonzoning controls, within 48 hours of detecting any violation of applicable land use restrictions that may adversely effect its water supply or distribution system. Such notices should include the following information:

1. the name of the person in violation;
2. the location where the violation is occurring;
3. the date when the violation was observed;
4. a description of the violation;
5. the legal citation of the requirement or restriction violated; and
6. a description of the actions necessary to remove or remedy the violation and the deadlines for taking such actions.

In addition, the supplier of water shall notify the Department's Office of Water Supply at the appropriate Regional Office upon giving any notice required by 310 CMR 22.21(4)(c).

(d) A supplier of water shall take appropriate action to determine whether the violation has been removed or remedied and shall notify the Department's Office of Water Supply at the appropriate Regional Office upon finding that the violation has been removed or remedied.

(5) Variances

(a) The Department may grant a variance from the requirements of 310 CMR 22.21(1)(e) to a proponent that, despite its best efforts, is unable to adopt one or more of the requirements set forth in 310 CMR 22.21(2)(a) and 310 CMR 22.21(2)(b) if the Department finds that strict compliance with such requirements would result in an undue hardship and would not serve to further the intent of 310 CMR 22.21.

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(b) The Department shall consider the following factors in making the finding necessary to grant a variance pursuant to 310 CMR 22.21(5):

1. the reasonableness of available alternatives to the proposed well, wellfield, or spring;
2. the overall effectiveness of existing land use controls and other protective measures on the proposed well, wellfield, or spring and any other water supply sources used by the supplier of water;
3. the nature and extent of the risk of contamination to the proposed well, wellfield, or spring that would result from the granting of the variance; and
4. whether the variance is necessary to accommodate an overriding community, regional, state or national public interest.

These factors need not be weighed equally, nor must all of these factors be present for the Department to grant a variance. The presence of any single factor may be sufficient for the granting of a variance.

(c) A variance granted pursuant to 310 CMR 22.21(5) shall be conditioned on such monitoring or other requirements as the Department may prescribe.

(d) Requests for variances shall be made in writing and clearly state the provision or requirement from which the variance is sought and the reasons and facts that support the granting of a variance, and shall include an evaluation of the reasonableness of alternatives to the proposed well, wellfield, or spring.

(e) Within 14 days of filing a request for variance under 310 CMR 22.21(5)(a), the person filing the request shall notify persons served by the supplier of water by direct mail and by publication on not less than three consecutive days in a newspaper of general circulation in the service area of the supplier of water. The notice shall include:

1. the provision or requirements from which the variance is being sought;
2. the identity of the proponent of the well, wellfield, or spring;
3. the identity of the person requesting the variance, the address where a copy of the request for variance will be available for public inspection, and the times it will be available; and
4. a statement that the Department will receive written comments concerning the request from the public for a 30 day period commencing on the last date of newspaper publication.

(f) Each person submitting a request for variance shall submit to the Department a copy of the public notice required by 310 CMR 22.21(5)(e) and affidavits attesting to the fact that the notices have been given. The Department will receive written comments concerning the request from the public for a 30 day period commencing on the last date of newspaper publication.

(g) Within 30 days of the close of the comment period, each person requesting a variance under 310 CMR 22.21(5)(a) shall respond in writing to all reasonable public comments received by the Department.

(h) The Department may schedule a public hearing on any request for variance submitted in accordance with 310 CMR 22.21(5) if it determines on the basis of the public comments received that such a hearing is in the public interest. In the event that the Department schedules a hearing, the person filing the request shall notify persons served by the supplier of water of the hearing by publication on not less than three consecutive days in a newspaper of general circulation in the service area of the supplier of water. In addition, the person filing the request shall notify each person who submitted written comment concerning the request to the Department by direct mail. The person filing the request shall submit to the Department a copy of the public notices required by 310 CMR 22.21(5)(h), and an affidavit attesting to the fact that the notices have been given, prior to the hearing. Persons filing a request for a variance under 310 CMR 22.21(5) shall pay the full the cost of all notifications and public hearing scheduled.

(i) Within 30 days of the grant of a variance under 310 CMR 22.21(5), any person that receives a variance shall notify persons served by the supplier of water of the granting of the variance, including any conditions imposed by the Department, by direct mail and by publication on not less than three consecutive days in a newspaper of general circulation in the service area of the supplier of water. The person that receives the variance shall submit to the Department a copy of the public notices and an affidavit attesting to the fact that the notices have been given upon completion of the public notification.

22.22: Cross Connections Distribution System Protection

(1) Purpose. The Department's purpose in establishing a comprehensive distribution protection program is to prevent the contamination of drinking water to the last free flowing outlets or consumer's tap. For this reason, the Department strongly advocates the elimination of all cross connections. The installation of backflow prevention devices does not eliminate a cross connection. The installation of backflow prevention devices is a protection solution when re-plumbing or re-piping is not feasible. All cross connection protection devices shall be approved and permited in accordance with 310 CMR 22.22.

(2) Maintenance of a Cross Connection

(a) No physical cross connection shall be maintained between the distribution system of a public water system, the water of which is being used for drinking, domestic, or culinary purposes, and the distribution system of any water source not approved by the Department, as being of safe sanitary quality, or any plumbing, fixture, or device whereby nonpotable water or other substances might flow into the potable water system, unless said connection has been protected by a backflow prevention device approved, in accordance with 310 CMR 22.22 or 248 CMR 2.00, as applicable.

(b) Backflow prevention devices shall be installed, based on the degree of hazard involved, at all fixtures and equipment where backflow and/or back siphonage may occur and whenever a minimum air gap cannot be provided between the public water system outlets to the fixture or equipment and its flood level rim. All fixtures that have a threaded hose type connection shall, at a minimum, have the required air gap separation and be equipped with a vacuum breaker in accordance with 248 CMR 2.14,

(c) Where a water connection is not subject to back pressure, a non-pressure type vacuum breaker shall be installed on the discharge side of the last valve on the line serving the fixture or equipment,

(d) Cross connections maintained or created on fire protection system shall comply with 310 CMR 22.22(9)(d).

(e) All cross connection requiring the installation of a double check valve assembly or a reduced pressure backflow preventer shall be approved and registered by the public water system.

(f) Cross connections protected by a device other than a double check valve assembly or a reduced pressure backflow preventer, approved and permitted by the inspector of plumbing in accordance with 248 CMR 2.00 do not require the approval of the Department, its designee or the public water system.

(g) Except for the installation of backflow prevention devices on fire protection systems, no double check valve assembly or reduced pressure backflow preventors shall be installed on a cross connection until the application for a plumbing permit is accompanied by a letter of approval from the Department, its designee or public water system pursuant to 248 CMR 2.14(c).

(h) Subject to applicable laws and regulations, public water systems shall have the authority to terminate any water service connection to any facility where cross connections are found to be in non-compliance with 310 CMR 22.22 . The supplier shall deny water service to any premises where cross connections exist until corrective action is taken. If necessary, water service shall be disconnected for failure to test or maintain backflow prevention devices in a manner acceptable to the supplier. If it is found that the backflow prevention device has been removed or by-passed or otherwise rendered ineffective, water service shall be discontinued unless corrections are made immediately.

(i) The public water system shall establish a time for completion of necessary corrections or removal of actual or potential cross connections, taking into consideration the degree of hazard involved and the time required to obtain and to install the needed equipment. The public water system shall use every means at its disposal to obtain voluntary compliance. However, if proper protection has not been provided after a reasonable period of time (following legal notification and subject to applicable laws and regulations), the public water system shall physically separate the public water supply from the on-site piping system in such a manner that the two systems cannot again be connected by an unauthorized person.

(j) Cross connections between a public water system and a private well or individual water source serving residential dwellings used for potable or nonpotable purposes are prohibited.

22.22: continued

(k) All backflow prevention devices shall be installed and repaired by a Massachusetts licensed plumber, except for backflow prevention devices installed on fire protection systems. A Massachusetts licensed fire sprinkler contractor is responsible for all work conducted on a fire protection system, including the installation, maintenance and repair of backflow prevention devices.

(l) An anti-siphon or back pressure device shall be installed on any apparatus that pumps any chemical into a potable water supply to prevent back siphonage.

(3) Public Water System Responsibilities. Every public water system shall be responsible for:

(a) Controlling cross connections to the last free flowing outlet of the consumer and for the safety of the public water system under its jurisdiction.

(b) Having a cross connection control distribution system protection program plan (the "cross connection program plan") approved by the Department as specified at 310 CMR 22.22(3)(b).

1. Every public water system is required to have its cross connection program plan approved by the Department by June 1, 1994.

2. Each plan must be prepared in accordance with departmental guidance and shall include, at a minimum, the following information: description of current program (*i.e.* staffing, tracking, surveying, testing, training and fee requirements) and evaluation of the current program, proposed changes and implementation plans. The plan shall also include an explanation of how the public water system will satisfy 310 CMR 22.22(3)(c) through 310 CMR 22.22(3)(r).

3. The plan shall be fully implemented and operational by January 1, 1999. A public water system may use a contractor, subcontractor, or consultant to assist in the program implementation except as specified at 310 CMR 22.22(3)(r). However, every public water system shall continue to be responsible for compliance with 310 CMR 22.22 and subject to enforcement by the Department.

4. The public water system shall obtain the Department's written approval prior to modifying its approved cross connection plan.

(c) Inspecting and surveying of all industrial, commercial, and institutional premises served by the public water system to determine if cross connections exist and that all cross connections are properly protected by an appropriate device or eliminated.

(d) Maintaining on the public water system premises the following documentation:

1. a schedule of all facilities inspected and surveyed;
2. records of all device locations;
3. related correspondence, including notices of violation; and
4. list of devices and inspections of approved backflow prevention devices.

(e) Ensuring that all backflow prevention device inspections are conducted by a Massachusetts Certified Backflow Prevention Device Tester and surveys for cross connections are conducted by a person who is certified by the Department as a Massachusetts Certified Cross Connection Surveyor.

(f) Establishing and maintaining a cross connection control program for residential users which shall include an educational component.

(g) Not allowing any cross connection at any point within its system unless said cross connection is approved pursuant to 310 CMR 22.22 or 248 CMR 2.00.

(h) Ensuring that all double check valve assemblies and reduced pressure backflow preventer devices are inspected and tested in accordance with the public water system program plan as approved by the Department and as specified at 310 CMR 22.22(13). The public water system has the option of testing the devices itself, having the device tested by the device owner, or having the testing conducted by a contractor.

(i) Establishing a program for auditing for devices not tested by public water system staff.

(j) Submitting a report to the Department annually on a form specified by the Department that shall include the following minimum information:

1. a list of all cross connections protected by an approved double check valve assembly or approved reduced pressure backflow preventer devices;
2. the numbers and types of facilities surveyed yearly; and
3. the number type and location of violations found.

22.22: continued

(k) Assisting Department personnel in any cross connection related inspections and backflow device installations;

(l) Taking appropriate action to eliminate cross connections and hazardous conditions, strongly promote compliance, and take the appropriate enforcement action when necessary;

(m) Notifying the cross connection owner of any violations of 310 CMR 22.22 by sending a Notice of Violation to owner;

(n) Notifying all device owners of their responsibilities relative to cross connections control and 310 CMR 22.00.

(o) Annually notify consumers of water and local public officials of the requirements of the distribution system cross connection control program, including Mayors, Town Managers, city and town councilors or selectmen, water commissioners, fire chiefs, local boards of health, plumbing inspectors, building inspectors, local state representatives, unless waived in writing by the Department.

(p) Generating all necessary correspondence relative to the administration and operations of the cross connection control program. The public water system will be responsible for all correspondence to device owners. All correspondence relating to the cross connection control program must be signed by the public water system.

(q) Reviewing and approving design data sheets and plans for proposed new installations of reduced pressure backflow preventers, and double check valve assemblies. . All design data sheets and plans shall be reviewed by a Massachusetts Certified Cross Connection Surveyor, effective January 1, 1999 as specified at 310 CMR 22.22(7)(a)4.. The public water system may not delegate, or subdelegate, contract, or subcontract this responsibility to any other entity, unless otherwise authorized in writing by the Department. The Department will require that all recommendations or findings made by the contracted certified surveyor, when reviewing and approving data sheets and plans, be submitted on the public water system letterhead and signed by an authorized person of the public water system.

(r) Ensuring, upon completion of installation that backflow prevention devices are installed according to the approved design data sheet and plans and tested for proper operation, effective January 1, 1999.

(4) Owners' Responsibilities. The owner of any cross connection protected by a double check valve assembly or reduced pressure backflow preventer shall:

(a) Notify the public water system of all cross connections protected by a double check valve assembly or reduced pressure backflow preventer and comply with all necessary approvals and permits from the public water system and/or the Department for the maintenance of cross connections, as specified at 310 CMR 22.22;

(b) Have suitable arrangements made so that inspections of backflow prevention devices and cross connection surveys can be made during regular business hours;

(c) Maintain a spare parts kit and any special tools required for the removal and reassembly of backflow prevention devices;

(d) Provide the necessary labor for inspection and testing by the Certified Backflow Prevention Device Testers or Certified Cross Connection Surveyor;

(e) Overhaul, repair, or replace within 14 days of the initial inspection date and retest pursuant to 310 CMR 22.22(13)(e), any device which fails a test or is found defective;

(f) Submit copies of the Inspection and Maintenance Report Form as required by the public water system.

(g) Maintain on the premises complete records on all devices for the life of said devices including as-built plans and design data sheets; maintain for seven years the Inspection and Maintenance Report Forms for tests conducted by the certified.

(h) Make certain that the cross connection protection device is tested as specified at 310 CMR 22.22(13) or as required by the public water system.

(5) Certified Backflow Prevention Device Tester's Responsibilities. Certified Backflow Prevention Device Testers have the following responsibilities relative to cross connections:

(a) Having a backflow preventer test kit that is maintained in proper working order and calibrated annually;

(b) Recording the test results for each inspection conducted;

22.22: continued

(c) Submitting copies of inspection reports to the water supplier, and the owner within 30 days of the inspection; and

(d) Maintaining records of all test results for a minimum of seven years.

(6) Local Plumbing Inspector Responsibilities. Local Plumbing Inspectors, authorized by M.G.L. c. 142 to administer and to enforce 248 CMR 2.00 (the State Plumbing Code), have the following responsibilities relative to cross connections:

(a) As required by 248 CMR 2.14(6), the Inspector of Plumbing will ensure that potable water supply systems are designed, installed and maintained in a manner as to prevent contamination from non-potable liquids, solids or gases which may be introduced to a potable water supply system through cross connections;

(b) After reviewing the plans and specifications for plumbing work under 248 CMR 2.04(5), and before issuing a permit, the Plumbing Inspector, as required by 248 CMR 2.14, shall require the installation of appropriate devices in accordance with 310 CMR 22.00; and

(c) No plumbing permit shall be issued for cross connection installations requiring Reduced Pressure Zone Backflow Preventors or Double Check Valve Assemblies until the application for such permit is accompanied by a letter of approval from the Department, its Designee or public water system.

(7) Installation Approval and Permit Requirements.

(a) Installation Approval.

1. No person shall install or remove or contract with another person for the installation or removal of any reduced pressure backflow preventer or double check valve assembly required by 310 CMR 22.22 unless a design data sheet with plans showing the method of protection of the public water distribution system has been approved by the Department, its Designee or the public water system for the installation of such device.

2. All persons shall obtain approval from the local plumbing inspector or the head of the local fire department, to the extent required by the State Plumbing Code, 248 CMR 2.04(3), or M.G.L. c.148, §27A, for the initial installation or retrofit for any change in the installation of any air gap separation with tank and pump arrangement, reduced pressure backflow preventer, or double check valve assembly.

3. Prior to the installation of any pressure or atmospheric vacuum breaker, backflow preventer with intermediate atmospheric vent, or barometric loop, the plans and specifications for the plumbing work must receive a permit issued pursuant to 248 CMR 2.04(3) by the local Plumbing Inspector. For these devices, a plumbing permit issued under 248 CMR 2.04(3) shall constitute installation approval pursuant to 310 CMR 22.22.

4. All design data sheets and plans for the installation of backflow prevention devices shall be reviewed by a certified cross connection surveyor as of December 31, 1998.

5. Design data sheets and plans for the installation of a backflow prevention device on fire protection systems shall not be approved by the public water system until a building permit has been issued by the Building Official who has jurisdiction over such system in accordance with 780 CMR Chapter 1 and 9 and approval by the head of the local fire department.

(b) Permit Requirement.

1. Any person owning or maintaining a cross connection protected by a double check valve assembly or a reduced pressure backflow prevention device that was approved by the Department, its designee or public water system shall register such protected cross connection device(s)with the public water system in accordance with 310 CMR 22.22(2). The Department will issue one annual permit to the public water system covering only those registered cross connection devices identified by the public water system in its annual statistical report to the Department.

2. The Department reserves the right to revoke or suspend any conditional approval and/or permit for cause.

(c) The Department may revoke any approval or permit for any installation or change in installation of any backflow prevention device which is found to be in noncompliance with 310 CMR 22.22.

22.22: continued

(8) Location of Devices.

(a) The location of each approved backflow prevention device, with respect to the plumbing on the premises and the service connection to the premises, shall be based upon the degree of existing or potentially existing health hazard, and shall conform to the following specific requirements:

1. Approved backflow prevention devices shall be located so that protection of all cross connections is achieved with a minimum number of devices;

2. Approved backflow prevention devices shall be located so as to provide in-plant protection;

3. The following types of facilities have been determined to present high health hazard conditions and in-plant protection shall be supplemented by installation of a reduced pressure backflow preventer or an air gap separation at the meter or property line unless an approved device is installed on a dedicated or process line, or if protection of the in-plant cross connection(s) is achieved to the satisfaction of the Department, its Designee or the public water system at:

a. Nuclear reactors or other facilities where radioactive materials are used;

b. Sewage treatment plants and sewage pumping stations;

c. Piers, docks, marinas, shipyards;

d. Chemical plants;

e. Metal plating industries;

f. Hospitals, mortuaries, medical clinics, dental offices and clinics;

g. Laboratories, except when the Department or its Designee has made a specific determination that no health hazard exists on the premises;

h. Other types of facilities as determined in writing by the Department or its Designee.

(b) If, upon request by the owner of the premises or upon its own initiative, the Department or its Designee or the public water system determines that it is unreasonable to locate all cross connections within the premises, or the Department or its Designee determines that protection of all cross connections is unreasonable for economic reasons, then (1) the public water supply distribution system shall be protected by installation of a reduced pressure backflow preventer or an air gap separation at the meter or property line, and (2) the owner of the premises shall provide a safe, alternative supply of potable water, well marked and labeled, to all domestic water fixtures on the premises.

(9) Types of Backflow Prevention Devices Required.

(a) Subject to the provisions of 310 CMR 22.22(10), Table 310 CMR 22-1 shall serve as the guide for the type of protection required.

22.22: continued

TABLE 22-1

AG - Air Gap
RPBP - Reduced Pressure Backflow Preventer
DCVA - Double Check Valve Assembly
AVB - Atmospheric Vacuum Breaker
PVB Pressure Vacuum Breaker
BPIAV - Backflow Preventer with Intermediate Atmospheric Vent

Types of Hazard on Premises	Acceptable Types of Backflow Preventers						Comments*
	AG	RPBP	DCVA	AVB	PVB	BPIAV	
1. Sewage Treatment Plant	X	X					
2. Sewage Pumping Station	X	X					
3. Food Processing	X	X	X*				*If no health hazard exists
4. Laboratories	X	X	X*				*If no health hazard exists
5. Fixtures with hose threads on inlets	X	X	X	X			In addition to an air gap separation, all fixtures that have a threaded hose type connection shall at a minimum, be equipped with a AVB in accordance with 248 CMR 2.14
6. Hospitals, Mortuaries, Clinics	X	X					
7. Plating Facilities	X	X					
8. Irrigation Systems	X	X		X*	X**		Each case should be evaluated individually. *An AVB can be used if no back pressure is possible and no health hazard exists.. **Pressure Vacuum Breakers can be installed if . back pressure is not possible
9. Systems or Equipment Using Radioactive Material	X	X					
10. Submerged Inlets	X	X		X*			*If no health hazard exists and no back pressure is possible
11. Dockside Facilities	X	X					
12. Valved outlets or fixtures with hose attachments	X	X		X*			Each case should be evaluated individually *If no health hazard exists and no back pressure is possible
13. Commercial Laundries and Dry Cleaners	X	X					
14. Commercial Dishwashing Machines	X	X		X*			*If no health hazard exists
15. High and Low Pressure Boilers	X	X*					*If chemicals are added
16. Low Pressure Heating Boilers						X	Residential and small commercial, having no chemicals added
17. Photo Processing Equipment	X	X					
18. Reservoirs -Cooling Tower Recirculating Systems	X	X					
19. Fire Protection Systems: For cross connection control, fire protection systems may be classified on the basis of water source and arrangement of supplies as follows: (a) Class 1: Direct connection from public water system mains only; no pumps, tanks, or reservoirs; no physical connection from other water supplies; no antifreeze or other additives of any kind; all sprinkler drains discharge to atmosphere, dry wells, or other safe outlets. These systems may or may not have fire department connections. Refer to 310 CMR 22.22(9)(d)1.	X	X	X				A backflow prevention assembly does not have to be installed on existing fire protection systems installed prior to March 21, 1997, provided that the fire protection system is registered with the public water system, equipped with a UL listed alarm check valve that is properly maintained in accordance with NFPA 25 and has not undergone substantial modification defined within 310 CMR 22.22(9)(d)3.Alarm check maintenance records must be available for inspection by the Department, its designee or the public water system

b. Class 2: Same as Class 1 except that booster pumps may be installed in the connections from the street mains .These systems may or may not have fire department connections. Refer to 310 CMR 22.22(9)(a).	X	X	X				A backflow prevention assembly does not have to be installed on existing fire protection system installed prior to March 21, 1997, provided that the fire protection system is registered with the public water system and equipped with a UL listed alarm check valve that is properly maintained in accordance with NFPA 25. Alarm check maintenance records must be available for inspection by the Department, its designee or the public water system
c. Class 3: Direct connection from public water system mains, plus one or more of the following: elevated storage tanks; fire pumps taking suction from aboveground covered reservoirs, or tanks; and pressure tanks.	X	X*	X*				*RPBP or DCVA contingent on evaluation of auxiliary supply and on-site system in accordance with 310 CMR 22.22(9)(d)1.

22.22: continued

Types of Hazard on Premises	Acceptable Types of Backflow Preventers						Comments*
	AG	RPBP	DCVA	AVB	PVB	BPIAV	
d. Class 4: Directly supplied from public water system mains, similar to Class 1 and Class 2 with an auxiliary water supply dedicated to fire department use and available to the premises, such as an nonpotable water source located within 1700 feet of the fire department connection, (FDC).	X	X*					*RPBP on evaluation of auxiliary supply and on-site system in accordance with 310 CMR 22.22(9)(d)1.
e. Class 5: Directly supplied from public water system mains, and interconnected with auxiliary supplies, such as pumps taking suction from reservoirs exposed to contamination, or rivers and ponds; driven wells; mills or other industrial water systems; or where antifreeze or other additives are used.	X*	X*					*RPBP or air gap contingent on evaluation of auxiliary supply and on-site system. Refer to 310 CMR 22.22(9)(d)1.
f. Class 6: Combined industrial and fire protection systems supplied from the public water mains only, with or without gravity storage or pump suction tanks.	X	X*			X	X	*RPBP contingent on evaluation of on-site water system Refer to 310 CMR22.22 (9)(d)1.
g. Residential fire protection systems for one and two family detached dwellings and manufactured homes only. Fire protection systems in three family dwellings meeting NFPA 13D requirements as provided in 780 CMR, Chapter 9, are included in this section.	X	X	X				Non testable devices and flow through systems should be used whenever possible. Systems are typically designed and installed in accordance with NFPA 13D: "Installation of Sprinkler systems in One and Two Family Dwellings and manufactured homes." These systems are authorized to use food grade antifreeze with no additional requirements when potable piping (PB, CPVC, and copper tube) is employed. If non-grade antifreeze is utilized, the system may be classified as a class 5. If a fire department connection is used, the requirements for a class 1 or 2 apply.
h. Residential fire protection systems for other than those described in Table 22-1-19.g.	X	X	X				Fire protection system in this category shall comply with the requirements set forth in class 1 through 4 as appropriate.
20. Solar Energy Systems	X	X				X*	Residential and small commercial having no chemicals or only USP Glycenne added to water
21. Single Jacketed Heat Exchangers	X	X					Each case should be evaluated individually

(b) Subject to the authority of the Department, its Designee, or public water system to issue the final determination of what type of device is required and the location of the device for each cross connection in individual cases, depending upon the degree of health hazard and type of backflow involved, the acceptable devices for backflow prevention include air gap separation, reduced pressure backflow preventers, double check valves assemblies, atmospheric or pressure vacuum breakers, backflow preventers with intermediate atmospheric vents, and barometric loops.

(c) There shall be no by-pass around any approved backflow prevention device unless the same type of approved backflow prevention device is installed on the by-pass.

(d) Fire Protection Systems.

1. Any new, existing or substantially modified fire protection system, including residential fire protection systems, shall be evaluated by the Department, its Designee or public water system to determine if a cross connection exists. If it is determined that a cross connection does exist, 310 CMR 22.22(9)(a) Table 22-1 shall serve as a guide in determining the type of protection device required. In evaluating the type of protection device required, the degree of hazard associated with the fire protection system, and the potability of the water pumped into the fire department connection, shall be considered, and the head of the local fire department shall be consulted.

2. All existing cross connections between public water systems and fire protection systems, as described in Table 22-1, 310 CMR 22.22(9)(a)19.a. and b., and installed prior to March 21, 1997, shall be equipped with a UL listed alarm check valve with the standard alarm pressure switch trim package. The device shall comply with the applicable requirements stated in 310CMR22.22(9)(d)6.: Fire protection systems installed on or after March 21, 1997, shall be equipped with a protection device specified in 310 CMR 22.22(9)(d)1. When backflow

prevention devices are to be retroactively installed on exiting fire protection system, a thorough hydraulic analysis, including revised hydraulic calculations, new fire flow data, and all necessary system modification to accommodate the additional friction loss, shall be completed as part of the installation in accordance with NFPA-13. The installation of a backflow prevention device only does not constitute a substantial modification of an existing fire protection system.

22.22: continued

3. The owner of a cross connection subject to 310 CMR 22.22(9)(d)2 shall register the connection(s) with the public water system . a copy of which shall be retained by the public water system as specified at 310 CMR 22.22.

4. Any owner of existing cross connection(s) who decides to install a protection device specified at 310 CMR 22.22(9)(a), Table 22-1, when the Department has not determined that such a protection device is necessary, shall obtain the prior written approval of the Department or its Designee of the design data sheets for the proposed protection device as specified at 310 CMR 22.22(9)(d)6.

5. Notwithstanding the provisions of 310 CMR 22.22(9)(d)3. and 4., by providing written notification to the owner of a cross connection between a public water system and a fire protection system, the Department or its Designee may, whenever the Department or its designee determines that the cross connection constitutes a threat to the public health, at any time require the installation of a protection device, modify or revoke the approval of a cross connection, or require water quality monitoring.

6. In addition to the requirements set forth in 310 CMR 22.22, the installation and testing of a backflow protection device on a fire protection system may be subject to the requirements of the following:

a. 780 CMR, Massachusetts State Building Code-Fire Protection Systems, Design, Installation, Testing and Maintenance Requirements.

b. 527 CMR, Massachusetts Fire Prevention Regulations, Installation Permits.

c. 250 CMR, board of Registration of Professional Engineers and Land Surveyors, Practice of Engineering and Preparation of Plans and Specifications.

d. 528 CMR, Bureau of Pipe fitters, Refrigeration, and Sprinkler Fitters, Qualification and Licensing of Installers.

e. M.G.L. c. 148, § 27A, Shutting Off of Existing Fire Protection systems and Permitting

f. 248 CMR, State Plumbing and Fuel Gas Code, Permits and Installation.

(10) Approval of Devices for Use in Massachusetts.

(a) Types and models of atmospheric breakers, pressure vacuum breakers/anti-siphon vacuum breakers, backflow preventers with intermediate atmospheric vent, dual check valve preventers, and hose connection vacuum breakers may be used in Massachusetts for certain low hazard applications referred to in the State Plumbing Code shall be those meeting the requirements of, and approved by, the Board of State Examiners of Plumbers and Gas Fitters.

(b) All reduced pressure backflow preventers, double check valve assemblies, and double check detector assemblies used in Massachusetts for the protection of a cross connection in accordance with 310 CMR 22.00 shall meet the standards established by at least one of the following organizations: American Society of Sanitary Engineering (ASSE), American Water Works Association or University of Southern California (U.S.C.) Specifications;

(c) Devices and valves installed on fire protection systems including dual check backflow preventer for residential fire sprinkler systems shall be listed by Underwriters Laboratory (UL) or approved by Factory Mutual Research in accordance with Appendix I of 780 CMR (the State Building Code), unless otherwise approved by the head of the local fire department.

(d) The Department reserves the right to prohibit the use of any cross connection protection devices in Massachusetts if the Department determines that such device is found, after subsequent review, to be defective or to have performed inadequately in the field..

(11) Installation Requirements.

(a) Reduced Pressure Backflow Preventers: Reduced pressure backflow preventers may be used to protect against backflow caused by back pressure or back siphonage and to protect a public water supply system from substances which are hazardous to health only when they are installed in the following manner:

1. For devices installed as in-plant protection, the reduced pressure backflow preventer shall be installed on the owner's side of the water meter on the potable water supply line.

2. Before installing a reduced pressure backflow preventer, all pipelines shall be thoroughly flushed to remove foreign material.

3. Drinking and domestic water lines, lines for safety showers, and lines for eye wash units must be taken off the upstream side of reduced pressure backflow preventers for devices installed as in-plant protection.

22.22: continued

4. The reduced pressure backflow preventer shall be located so as to permit easy access and provide adequate and convenient space for maintenance, inspection, and testing.

5. The owner of the device shall be able to shut down water lines after reasonable notice during normal business hours to permit necessary testing and maintenance of the device, provided that if it is not possible to meet this requirement a by-pass line equipped with an approved type reduced pressure backflow preventer shall be installed.

6. The reduced pressure backflow preventer and shut-off valves must be installed in a horizontal alignment between three and four feet from the floor to the bottom of the device and a minimum of 12 inches from any wall. Vertical installation of devices shall be determined by the public water system.

7. Tightly closing valves must be installed at each end of the device and be immediately accessible unless otherwise approved by the Department or its Designee or public water system.

8. The device must be protected from freezing, flooding, and mechanical damage.

9. If the device is to be installed on a hot water line, a device approved for use at the elevated temperature must be used.

10. If a drain is to be provided for the relief valve port, there must be an approved air gap separation between the port and drain line. To be approved, the air gap must be at least twice the internal diameter of the discharge line.

11. Pit installation shall be approved only as provided in 310 CMR 22.22(11)(f).

12. All water lines shall be color coded according to the state plumbing code, except that water filtration plants, pumping stations, sewage treatment plants and sewage pumping stations shall label all water lines in lieu of color coding.

(b) Double Check Valve Assemblies: Double check valve assemblies may be used to protect against backflow caused by back pressure or back siphonage and to protect a public water supply system from substances which may be objectionable, but not hazardous to health, only if they are installed in the following manner:

1. Drinking and domestic water lines, lines for safety showers, and lines for eye wash units must be taken off the upstream side of the double check valve assembly for devices installed as in-plant protection.

2. The double check valve assembly shall be installed with adequate space to facilitate maintenance, inspection, and testing.

3. The double check valve must be installed horizontally and the top of the double check valve assembly must be between 12 inches and 48 inches from the floor to the bottom of the device and a minimum of 12 inches from any wall. Vertical installation of devices shall be determined by the public water system.

4. If a water meter is not provided on the upstream side of an approved swing-type double check valve assembly, a three to five foot spacer must be installed between the check valves.

5. Tightly closing valves must be installed at each end of the device and be immediately accessible unless otherwise approved by the Department or its Designee.

6. Double check valve assemblies must be readily accessible for testing and service and provided with suitable connections and appurtenances for testing.

7. The device must be protected against flooding, freezing and mechanical damage.

8. Pit installation will be approved only as provided in 310 CMR 22.22(11)(f).

(c) Vacuum Breakers: Vacuum breakers shall not be used to protect against backflow due to back pressure and shall not be installed as protection for high hazard conditions as determined by the Department, its Designee or public water system. Vacuum breakers may be used for low health hazards only if they are installed in the following manner:

1. Vacuum breakers must be installed at least six inches above the flood level rim of the fixture they serve.

2. Atmospheric vacuum breakers must be installed downstream of the last shut off servicing the fixture or equipment.

3. Vacuum breakers must not be installed in locations where the device is subject to corrosive fumes, dust or grit.

4. Vacuum breakers must be protected against flooding, freezing and mechanical damage.

22.22: continued

5. Atmospheric vacuum breakers shall not be used under conditions of static line pressure. Pressure vacuum breakers may be used under conditions of static line pressure.

6. Vacuum breakers shall be installed on all fixtures that have a threaded hose type connection as required in 248 CMR 2.14, in addition to an air gap separation.

(d) Barometric Loops: Barometric Loops may be used only to protect against back siphonage, shall be approved for use only when no health hazard exists and when back pressure is not possible.

(e) Air Gap Separation: Air gap separation may be used to protect against backflow caused by back pressure or back siphonage and to protect a public water supply system from substances which are hazardous to health and shall be approved for use only when installed in accordance with Uniform State Plumbing Code, 248 CMR 2.00.

(f) Pit Installation: No devices shall be installed in pits except as specifically approved by the Department, its Designee or public water system in cases of unique circumstances, and must comply with 29 CFR 1910.196, OSHA regulations where applicable for work in confined spaces then only as follows:

1. the pit interior shall be a minimum of ten feet long, six feet wide, and must have a clear height 6½ feet high;
2. the pit must be watertight;
3. the pit opening and manhole cover must be at least 30 inches in diameter;
4. The foothold inserts must be of steel, aluminum, or other material approved by the Department, must be a maximum of 12 inches apart, and must be installed so that the top foothold is within 12 inches of the manhole cover and the bottom foothold is within 12 inches of the pit floor;
5. An adequate drain must be installed and the drain line shall not be connected to a sewer;
6. The pit floor shall be pitched to the drain;
7. If built in a roadway, the top of the pit must be adequately reinforced.

(12) Cross Connection Certification

(a) Cross Connection Backflow Prevention Device Tester. Any person seeking Department certifications as a Backflow Prevention Device Tester in the Commonwealth of Massachusetts shall meet all of the following requirements:

1. pass a written and practical certification examination which is approved by the Department for "Backflow Prevention Device Tester".
2. apply to the Department for certification on the form provided by the Department. This submittal must include payment of the certification fee established by the Department.
3. Application for certification must be submitted to the Department no later than 12 moths after the date the applicant received notice of passing a Department approved examination.

(b) Cross Connection Control Surveyor. Any person seeking Department certification as a Cross Connection Surveyor in the Commonwealth of Massachusetts shall meet all of the following requirements:

1. Pass a written examination approved by the Department for Cross Connection Control Surveyor".
2. Apply to the Department for certification on the form provided by the Department. This submittal must include payment of the certification fee established by the Department.
3. Application for certification must be submitted to the Department no later than 12 months after the date the applicant received notice of passing a Department approved examination.

(c) Any person, upon satisfying the requirements of 310 CMR 22.22(13)(a), shall receive from the Department a certificate which indicates that he or she is a:

1. Certified Backflow Prevention Device Tester; or
2. Certified Cross Connection Surveyor; or
3. Combination Certified Backflow Prevention Device Tester/Certified Cross Connection Surveyor.

(d) All certificates will remain valid for three years from the date of issuance.

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(e) Renewal of Certification. Any Certified Backflow Prevention Device Tester, Cross Connection Surveyor or person holding a valid Combination Certificate who desires to renew his or her certification must submit a renewal application including any renewal fee and prerequisites, no later than one month prior to the expiration date of his or her certificate.

1. Backflow Prevention Device Testers: Persons applying for renewal shall complete at least 24 inspections/tests of backflow prevention devices and obtain a least three training contact hours (TCH) in the past three years. Proof of inspections and TCH shall accompany the application.

2. Cross Connection Surveyor. Persons applying for renewal shall complete at least three cross connection surveys and obtain a least three training contact hours (TCH) in the past three years. Proof of surveys and TCH shall accompany the application..

(f) Persons failing to meet the certification renewal requirements at 310CMR 22.22(13)(e)1. and/or 2. within three years from the date that the certification expired must retake an examination approved by the Department for renewal.

(g) Recertifcation Requirements. Persons failing to renew their certification within three years from the date that the certificate expired, must retake an examination approved by the Department for recertification.

(h) Persons holding both a valid Backflow Prevention Device Testers certificate and a valid Cross Connection Surveyor certificate shall be issued a Combination Certificate.

(i) Persons holding a combination certification shall satisfy all the renewal requirements stated at 310 CMR 22.22(12)(e), except for the TCH requirements. Only three TCH will be required for a combination certificate.

(13) Inspection Surveying, Testing and Overhauling of Devices.

(a) All cross connection surveys shall be conducted by a person who is a Massachusetts Certified Cross Connection Surveyor. All backflow prevention device tests shall be conducted by a certified Backflow Prevention Device Tester in accordance with 310 CMR 22.22. A person holding a Combination Certification may conduct a cross connection survey and/or backflow prevention test.

(b) Within 14 calendar days after the installation of devices in accordance with plans reviewed and approved by the reviewing authority, the owner or owner's agent shall notify the public water system to arrange for the inspection of the installation.

(c) Reduced pressure backflow preventers, double check valve assemblies, may be inspected and tested by the Department, its designee or the public water system at any time.

(d) The public water system is responsible to ensure that each reduced pressure backflow preventer will be inspected semiannually in accordance with the public water system's approved cross connection program plan, as provided for in 310 CMR 22.22(3)(b) . If the supply is used less than six months of the year, these devices shall be inspected and tested once each year. Each double check valve assembly shall be tested annually. Pressure type vacuum breakers should be tested at least annually by the owner of the device. Each test shall be conducted by a Certified Backflow Prevention Device Tester.

(e) Devices which fail the test or are found to be defective shall be overhauled, repaired, or replaced and retested within 14 calendar days of the failure or from the discovery of the defect. The repair work must be done by a plumber licensed by the Commonwealth of Massachusetts to the extent required by 248 CMR 2.04(3). No person shall overhaul, repair, replace a device on a fire system without approval from the head of the local fire department pursuant to M.G.L. c.148, §27A.

(f) No two routine tests for reduced pressure backflow preventers required by 310 CMR 22.22 shall be conducted within five months of each other without the written approval of the Department, its designee or the public water system.

(g) The owner or owner's agent must maintain on the premises a spare parts kit and any special tools required for removal and reassembly of devices which are to be tested. The presence of these materials must be recorded on the Inspection and Maintenance Report Form.

(h) The owner or owner's agent must provide labor on the premises as necessary to allow inspection and testing of devices by the Department, the supplier of water, or Certified Backflow Prevention Device Testers.

22.22: continued

(i) The owner or owner's agent shall notify the public water system in writing, no later than 30 days prior to the removal from service of any permitted device and such notification shall include the reason for removal and must indicate if the cross connection has been eliminated.

(j) The owner or owner's agent shall notify the public water system in writing no later than 30 days prior to a change in ownership. Notification must include, at a minimum, the name and address of the new owner as well as documentation with proof of change in ownership.

(k) If the public water system deems necessary, it may test a device more frequently to ensure proper cross connection control.

(14) Right of Entry. All owners or operators of commercial, industrial or institutional premises served by a public water supply system shall authorize agents and employees of the Commonwealth, upon presentation of their credentials, to enter their premises without a warrant for the purpose of inspecting and surveying their water systems for cross connections and assuring compliance with 310 CMR 22.22, whether or not the Commonwealth has evidence that the system is in violation of an applicable legal requirement.

(15) Fees.

(a) The certification fees for Backflow Prevention Device Testers and Cross Connection Control Surveyors are established by the Department as stated in 310 CMR 4.00.

(b) A person holding either a Testers or Surveyors certificate will not be charged an additional fee for a combination certification provided that all the requirement of 310 CMR 22.08 have been met.

(c) Permit fees as specified at 310 CMR 22.22(7)(b) are established by the Department in accordance with 310 CMR 4.00.

(16) Enforcement.

(a) Whoever maintains a cross connection in violation of M.G.L. c. 111, § 160A, shall be:

1. punished by a fine of not more than $25,000 for each day such violation occurs or continues, or by imprisonment for not more than one year, or both such fine and imprisonment, or

2. subject to a civil penalty not to exceed $25,000 per day for each day that such violation occurs or continues.

(b) Any violation of 310 CMR 22.22 shall be subject to the administrative penalty provisions of 310 CMR 5.00.

(c) Upon due notice to the person maintaining the connection the Department may revoke any permit whenever, in the opinion of the Department, the cross connection or the maintenance thereof no longer complies with 310 CMR 22.00.

(d) After notice and opportunity for a hearing, the Department may suspend or revoke the certification of any Backflow Prevention Device Tester or Cross Connection Control Surveyor for cause. A certified backflow prevention device tester or certified cross connection control surveyor whose certification has been suspended or revoked by the Department may not test devices or conduct any surveys pending the outcome of the hearing, if any.

(e) Audit: The Department may perform audits of a Public Water System's distribution system protection cross connection control program to ascertain whether the PWS is in compliance with 310 CMR 22.22, and to ascertain the fitness and purity of the water for domestic use and to secure the sanitary protection of such waters, pursuant to MGL c. 111, §160. The Department may issue a written order, pursuant to M.G.L. c. 111, § 160A, requiring a supplier of public water to perform any action necessary to assure the delivery of fit and pure water through its distribution system, including the actions required under 310 CMR 22.22(13).

(f) In order to ensure the delivery of a fit and pure water supply, the Department may issue a written order, pursuant to M.G.L. c. 111, § 160, requiring a supplier of public water to cease supplying water to any premises if one or more cross connections are maintained in violation of the requirements of 310 CMR 22.22, or requiring any person to take such actions as are reasonable and necessary to prevent or to eliminate cross connections.

22.23: Use of Non-Centralized Treatment Devices and Bottled Water

(1) Public water systems shall not use bottled water to achieve compliance with an MCL listed in 310 CMR 22.00. Bottled water may be approved by the Department for use on a temporary basis to avoid any unreasonable risk to health.

(2) Public water systems using bottled water as a condition of obtaining an exemption from the requirements of 310 CMR 22.07B(1) and 310 CMR 22.07A, and 310 CMR 22.06(16) must meet the requirements in 310 CMR 22.14(25)

(3) Public water systems that use point-of-use or point-of-entry devices as a condition of receiving an exemption must meet the requirements in 310 CMR 22.14(27).

(4) Public water systems may use Point of Use (POU) and/or Point of Entry (POE) devices to comply with a MCL in 310 CMR 22.00, provided the system receives the prior written approval of the Department in accordance with 310 CMR 22.04 and complies with the following minimum requirements:

(a) The POU or POE device shall be owned , controlled, operated and maintained by the public water system in accordance with 310 CMR 22.00. .

(b) The POU or POE device shall be equipped with mechanical warnings device to ensure that customers are automatically notified of operational problems.

(c) The POU or POE device is included in the Department's approved list of technologies for small systems and approved by the Massachusetts Board of Plumbers and Gasfitters.

(d) The POU or POE device shall be installed in conformance with 248 CMR 2.00, Uniform State Plumbing Code.

(e) The public water system shall submit to the Department for review and approval a monitoring plan that ensures that the devices provide health protection equivalent to that provided by central water treatment.

(f) The public water system must apply effective technology under a Department approved plan. The microbiological safety of the water must be maintained at all times.

(g) The public water system shall ensure that buildings connected to the system have sufficient point-of-use or point-of-entry devices that are properly installed, maintained, and monitored such that all consumers will be protected.

(h) The POU or POE device has an adequate certification of performance including field testing or the device has undergone a rigorous engineering design review.

(i) The design and application of the point-of-use and/or point-of-entry devices consider the potential for increasing concentrations of heterotrophic bacteria in water treated with activated carbon. It may be necessary to use frequent backwashing, post-contractor disinfection, and Heterotrophic Plate Count monitoring to ensure that the microbiological safety of the water is not compromised.

(j) Each building connected to the system must have a POU or POE device that is properly installed, maintained, and monitored. Each building is subject to treatment and monitoring, and the rights and responsibilities of the public water system customer convey with title upon sale of property.

(5) With prior written approval of the Department in accordance with 310 CMR 22.04(1), a POE or POU device may be installed in a facility to meet an action level, treatment technique in lieu of an MCL, or other requirements of 310 CMR 22.00. The facility, upon the installation of the POE or POU device, shall constitute a consecutive public water system as defined in 310 CMR 22.02, provided the facility meets the definition of a public water system as defined in 310 CMR 22.02. A consecutive system that installed a POU or POE device in accordance with 310 CMR 22.23(5) is subject to all of the requirements of 310 CMR 22.00 unless said system complies with 310 CMR 22.23(6)(a) through (i) and demonstrates to the Department's satisfaction that it meets the criteria in 310 CMR 22.03(3)(b) through (e).

(6) If a POE device is installed in a facility solely to enhance the aesthetic quality of the drinking water and, because of the installation of such a device the facility meets the definition of a public water system in 310 CMR 22.02, it shall constitute a consecutive public water system subject to all of the requirements of 310 CMR 22.00, unless the system complies with the following minimum requirements:

22.23: continued

(a) the facility shall advise the Department and the supplying public water system in writing of the intended installation of the device;
(b) the facility shall be responsible for the operation and maintenance of the device, subject to adequate oversight by the supplying public water system;
(c) the facility shall comply with the requirements of the supplying public water system;
(d) the facility shall provide a detailed written notification of the installation of the POE device to the local health authority having jurisdiction over the facility;
(e) the facility shall only use POE devices approved by the Board of State Examiners of Plumbers and Gasfitters;
(f) the facility shall install the POE device in accordance with 248 CMR 2.00, Uniform State Plumbing Code;
(g) the facility shall monitor the quality of water as specified by the supplying public water system, the Department or the local health authority :
(h) the facility shall ensure that any wastewater discharge complies with all applicable federal, state and local regulations, and
(i) the facility shall maintain the microbiological quality standards of the water at all times as specified at 310 CMR 22.05.

(7) The Department may require any facility or other entity meeting the requirements of 310 CMR 22.23(5) and (6) to comply with any or all other requirement of 310 CMR 22.00, if the Department determines that such action is necessary to protect the health of the consumers of water.

22.24: Sale, Transfer of Property Interest, or Change in Use of Water Supply Land

(1) No supplier of water may sell, lease, assign, or otherwise dispose of, or change the use of, any lands used for water supply purposes without the prior written approval of the Department. The Department will not approve any such disposition or change in use unless the supplier of water demonstrates to the Department's satisfaction that such action will have no significant adverse impact upon the supplier of water's present and future ability to provide continuous adequate service to consumers under routine and emergency operating conditions, including emergencies concerning the contamination of sources of supply, failure of the distribution system and shortage of supply.

(2) Land Transfers Any sale, transfer of property interest or change in use of land acquired for water supply purposes may also require approval by a ⅔ vote of the Legislature, in addition to Department approval. (Massachusetts Constitution Amend. Art. XCVII, Section 243)

(3) Easements The Department will not approve any grant of easement for pipelines, or other conduit, carrying liquid petroleum products within the Zone I of a PWS. For other public utility easements within Zone I, the Department may require as a condition of any grant of such easement an express perpetual prohibition on the use of fertilizers, pesticides, herbicides, and other non-mechanical means of vegetation control within the area subject to the easement.

(4) The owner/operator of any non-community public water system shall notify the Department in writing at least 30 days in advance of any proposed sale of the system and/or change in the type of facility served by the system.

22.25: Abandonment of Water Supply Sources

(1) No supplier of water may remove a public water system source from service or abandon a public water system source without the prior written approval of the Department. The Department will not approve any such action unless the supplier of water demonstrates to the Department's satisfaction that such action will have no significant adverse impact upon the supplier of water's present and future ability to provide continuous adequate service to consumers under routine and emergency operating conditions, including emergencies concerning the contamination of sources of supply, failure of the distribution system and shortage of supply.

22.25: continued

(2) The supplier of water shall maintain each public water system source removed from service as an emergency source unless the Department approves its disposition in accordance with 310 CMR 22.24 or its abandonment in accordance with 310 CMR 22.25. All public water system groundwater sources approved for abandonment or permanent closure may continue to be used as non-public water system sources. The Department may require closure of certain groundwater sources in a manner that minimizes the potential for groundwater contamination and public health risk, by permanently preventing vertical movement of water within the borehole and annular space and eliminating all physical hazards at the ground surface associated with the well's construction or location. Proposals for permanent closure shall describe the closure method and materials to be used and shall be submitted to the Department for review and approval.

22.26: Severability

If any provision of 310 CMR 22.00 or its application to any unit of government is held invalid, such invalidity shall not affect other provisions or applications of 310 CMR 22.00 which can be given effect without the invalid provision or application and to this end the provisions of 310 CMR 22.00 are declared to be severable.

REGULATORY AUTHORITY

310 CMR 22.00: M.G.L. c. 111, § 160A.

NON-TEXT PAGE